BRISTOL BAY SOCKEYE SALMON
INRIVER TEST FISHING, 2003

by

Frederick W. West

Regional Information Report[1] No. 2A04-02

Alaska Department of Fish and Game
Division of Commercial Fisheries
Regional Office
333 Raspberry Road
Anchorage, Alaska 99518-1599

January 2004

AUTHOR

Frederick W. West is a fishery biologist with the Alaska Department of Fish and Game, Division of Commercial Fisheries, Bristol Bay Research Section, 333 Raspberry Road, Anchorage, AK 99518.

ACKNOWLEDGMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF APPENDICES

LIST OF APPENDICES

ABSTRACT

Drift gillnets were fished daily at two stations, located on opposite river banks, prior to every high slack tide in Kvichak, Egegik, and Ugashik Rivers, Bristol Bay, Alaska, from mid-June to mid-July 2003 to estimate sockeye salmon inriver abundance. Fishery managers used test fish preliminary escapement estimates as an inseason management tool to regulate commercial harvests and achieve escapement goals. The daily inriver test fish index for each river was the mean of catch per unit effort values obtained from all test drifts made on a given day. Numbers of sockeye salmon that escaped the commercial fishery were estimated using (1) travel time analysis in which the most recent daily tower count was divided by daily inriver test fish indices and lagged back in time by daily increments and (2) the mean fish per index point (FPI) value. Travel time estimates could not be made until a minimum of test fishing data and tower counts were collected. Mean FPI estimates were available on the first day of each project. On the final day of test fishing, the Kvichak River FPI was 29 and travel time was estimated at 2 d; the Egegik River FPI was 59 and travel time was estimated at 1.5 d; and the Ugashik River FPI was 32 and travel time was estimated at 2 d.

KEY WORDS: sockeye salmon, *Onchorhynchus nerka,* inriver test fishing, inriver abundance estimation, fisheries management, Bristol Bay

INTRODUCTION

The Bristol Bay Management Area supports the largest sockeye salmon *Oncorhynchus nerka* fishery in the world (Figure 1). The ten-year average (1993-2002) of the total sockeye run to Bristol Bay is 34.4 million fish and total harvest has averaged 24.2 million fish (West 2003b). Sockeye salmon return to Bristol Bay over a brief time period and this, combined with the large numbers of fish involved, makes it one of the most intense salmon fisheries in the world. Sockeye salmon in Bristol Bay are managed on an escapement goal range policy, with escapement goal ranges set for individual rivers. Fishery managers control the commercial harvest to meet these goals by limiting time, area and gear used by commercial fishermen. The most important information used by managers to meet these goals are estimates of total fish that have returned to date. This total return is composed of catch and escapement. Catch estimates are obtained from the processing companies. Estimating the number of fish that have escaped the fishery to spawn is often difficult, especially once they have moved inriver but have not passed the counting tower.

Inriver gillnet test fish projects are used to estimate the number of fish that escaped the commercial fishery but are still unaccounted for at the tower site, or what is called estimated river fish (ERF). Inriver test fishery data are available approximately 1 day after sockeye salmon have passed through the commercial fishing district and several days earlier than estimates based on visual counts from observation towers located at the heads of the river systems. Inriver test fish data assists management biologists in regulating commercial fishing periods to maximize harvests and achieve escapement goals.

Inriver test fishing projects have operated on Kvichak River since 1960, on Egegik River since 1963, and on Ugashik River since 1961 (McBride 1978; Paulus 1965; West 2003a). An inriver test fishing project also operated on Igushik River from 1976-1989 and 1991-2000. Igushik River test fish was not operated in 1990 and has not operated since 2000 because of budget cuts. This report summarizes 2003 inriver test fish data and evaluates the accuracy of inseason forecasting methods.

METHODS

Inriver Test Fishing

Two stations on opposite riverbanks were fished in the lower section of Kvichak, Egegik, and Ugashik Rivers (Table 1). Test fish stations were close to the commercial fishing district boundary and assumed to be above sockeye salmon milling areas. Station locations for each of the three rivers have remained the same since 1987 (Fried and Bue 1988a).

Gillnets were drifted at all inriver test fish sites to estimate sockeye salmon abundance. All drifts were made perpendicular and close to shore based on the assumption that sockeye salmon migrate parallel to and near the riverbank. Drifts at all stations ended when the inshore end of the net drifted about 25 m offshore or when it was no longer fishing efficiently. Two short drifts of <15 min duration were made at each station of each river beginning about 1.5 h before every high slack tide to minimize currents carrying the gillnet offshore. When catches increased to the point where two drifts per station per tide were difficult to process given time restraints, only one drift was made at each station until catches fell to a manageable level again.

All gillnets were 45.7 m (150 ft or 25 fathoms) in length and 29 meshes deep. Monotwist web, hung evenly with #50 twine and dyed Momoi shade #1, was used for test fishing on all rivers. Multistrand monofilament was used until 1989; however, this web type is now illegal for commercial use and is no longer stocked by suppliers. A stretched mesh size of 12.70 cm (5 in) was used on Kvichak River and 13.02 cm (5-1/8 in) was used on Egegik, and Ugashik Rivers.

Catch per unit of effort (CPUE), or the number of sockeye salmon caught in 180 m (600 ft or 100 fathoms) of gillnet fished for 1 h, was estimated for each set.

Water temperature (°C) was recorded at all rivers on every high tide prior to test fishing.

Data Analyses

Mean fishing time (MT), in minutes, was calculated for each set as

$$MT = SI - FO + \frac{(FO - SO) + (FI - SI)}{2},$$ (1)

where:

SO = time the gillnet first entered water,

FO = time the gillnet was fully deployed,

SI = time the gillnet retrieval began, and

FI = time the gillnet retrieval completed.

The CPUE value, C_j, or the number of sockeye salmon caught per 100 fathom hours, was calculated for set j as follows:

$$C_j = 6,000 \frac{N}{G \times MT},$$ (2.1)

where:

        N = number of sockeye salmon caught, and

    . G = gillnet length in fathoms.

The daily inriver test fish index, I_i, for day i was calculated as the mean of individual CPUE values obtained from sets made the same day, or

$$I_i = \frac{\sum_{j=1}^{s} C_j}{S},$$
(2.2)

where:

        S = number of sets made during day i.

Two methods were used to estimate daily inriver abundance: (1) travel-time (FPI$_d$), and (2) mean FPI value (FPI$_a$).

(1) Travel-time of inriver fish was based on the number of days it took sockeye salmon to travel from test fish sites to counting tower sites. A range of travel-time estimates was calculated by matching daily test fish indices to daily tower counts. The number of sockeye salmon represented by each index point was calculated by dividing the most recent cumulative tower count by cumulative test fish indices lagged back in time by daily increments such that

$$FPI_d = \frac{\sum_{i=1}^{t} E_i}{\sum_{i=1}^{t-d} I_i},$$
(3)

where:

        FPI$_d$ = number of sockeye salmon represented by each test fishing index point based on a travel-time of d days,

        E_i = number of sockeye salmon traveling past counting tower on day i, and

        t = day of most recent inriver fish abundance estimate.

We chose lag d that minimized the following sum of squares, SS, between the cumulative test fish indices and the tower counts where

$$SS = \sum_{j=1}^{t} (FPI \cdot \sum_{i=1}^{j} I_{i-d} - \sum_{i=1}^{j} E_i)^2 .$$
(4)

3

However, travel times that seemed unrealistic based on results of past studies or produced unreasonable escapement estimates (e.g., less than observed escapement) were rejected even if they produced the best statistical fit to the data.

Total inriver fish abundance was then calculated as

$$\hat{E}_{t+d} = FPI_d \sum_{i=1}^{t} I_i, \tag{5}$$

where:
E_{t+d} = estimated number of sockeye salmon that will travel past counting tower on day $t+d$.

(2) Mean FPI values of inriver fish abundance were based on pre-season calculated mean FPI values. Mean FPI was derived using a combination of models that incorporate average length, age composition, escapement, time series analysis and FPI values recorded on the last day of test fishing from 1986-2002 (Tables 2-4). The mean FPI estimate of inriver fish abundance is the product of the mean FPI and the cumulative inriver test fish index. Mean FPI value estimates of inriver fish abundance were used until travel time analysis estimates proved more accurate.

Three statistics were used to measure performance of the various inriver fish abundance estimators. Percent error, PE, was used to measure daily performance:

$$PE = 100 \; x \; \frac{T_{t,a} - \sum_{i=1}^{t+d} E_i}{\sum_{i=1}^{t+d} E_i}, \tag{6}$$

where:
$T_{t,a}$ = estimated daily inriver fish abundance on day t based on method a.

Mean percent error, MPE, was used to measure bias:

$$MPE = \sum_{t=1}^{n} \left(\frac{100 \; x \; T_{t,a} - \sum_{i=1}^{t+d} E_i}{\sum_{i=1}^{t+d} E_i} \right), \tag{7}$$

where:
n = total number of days that inriver fish abundance estimates based on test fishing were available.

Mean absolute percent error, MAPE, was used to measure overall accuracy because it treated under- and over-estimation errors similarly:

$$MAPE = \sum_{i=1}^{n} \left| \left(100\,x\,\frac{T_{t,a} - \sum_{i=1}^{t+d} E_i}{\dfrac{\sum_{i=1}^{t+d} E_i}{n}} \right) \right| \qquad (8)$$

In season, the travel time model is used to estimate the number of fish in the river between the test fishing site and the tower. In practice however, the estimated number of inriver fish from the model is often modified with ancillary information provided by an area manager, which may include:

- Recent aerial surveys;
- District test fish catch-per-unit effort; and
- Up-to-the-minute escapements not included in the daily model.

In this report, the inriver fish estimate released to the public has been termed the Published Model.

To better understand if the use of ancillary information is successful in hindsight, we've developed an analysis to compare the errors associated with each inriver forecast method. Because the true number of fish between the test fishing site and tower is unknown, necessary assumptions were used to calculate an "actual" number of inriver fish. This was done for travel time and published forecasts by relating the respective inriver estimate to the corresponding lag time from the SSQ model output. For example, if a travel time of two applied, the actual number of inriver fish was calculated by subtracting escapement on day $t+2$ minus escapement on day t. Taking the absolute difference of the actual escapement and forecasts estimated from travel time or using ancillary information determined model errors.

RESULTS

Kvichak River

Test fishing began 20 June and ended 12 July. A total of 3,006 sockeye salmon were caught, producing 57,220 index points (Table 2, Appendix A.1). A preseason mean FPI value of 50, based on time series relationships of FPI values used within the last three to five years, was used through 21 June. Fifty was determined to be high and downgraded to 35 by taking the mean of the last three years of season ending FPI's and the downgraded value was used from 22-23 June to estimate test fish inriver fish abundances. The FPI was further downgraded to 20, based on catch rates similar to last year, and this value was used through 25 June. Sufficient spawning escapement data were collected by 26 June to allow estimation of FPI values based on travel

time. Estimated travel times during the season ranged from 1 to 2 d. On the last day of project operation, the best estimate of travel time was 2 d and the FPI was 29 (Table 2, Appendix B.1). A complete summary of catch by day, species and fishing time at the Kvichak River test fish project is presented in Appendix C.1.

Daily inriver fish abundance estimates based on daily travel time analysis (26 June-12 July) ranged from 81% less to 216% greater than observed tower counts (Table 2, Figure 2). The final daily travel time analysis estimate of 95,855 sockeye salmon on 12 July had a percent error of 96% greater than the 2 d lag tower count of 48,978 (13-14 July). Our best performing ERF occurred on 4 July with an estimated 245,411 fish inriver compared to the 1.5 d observed escapement of 230,505, resulting in a percent error of 6% (Table 2).

Accuracy (MAPE) and bias (MPE) for travel time analysis test fish inriver abundance estimates compared to lagged daily tower counts were 61% and 39% respectively. Figure 3 shows the resulting absolute errors for both the straight travel time and published methods on the Kvichak River. The published forecast provided lower or similar errors than the straight travel time model. The greatest errors were associated with large surges of fish on 28 June and 10 July.

Egegik River

Test fishing began 15 June and ended 11 July. A total of 4,020 sockeye salmon were caught producing a cumulative index of 19,668 (Table 3, Appendix A.2.). The preseason calculated mean FPI value of 70, based on time series relationships of FPI values used within the last three to five years, was used for test fish inriver fish abundance estimates for 15-20 June. Sufficient spawning escapement data were collected by 21 June to allow estimation of FPI values based on travel time. Estimated travel times during this period ranged from 1.5 to 3.0 d. On the last day of project operation, the best estimate of travel time was 1.5 d and the FPI was 59 (Table 3, Appendix B.2.). A complete summary of catch by day, species and fishing time at the Egegik River test fish project is presented in Appendix C.2.

Daily inriver fish abundance estimates based on daily travel time analysis (21 June-11 July) ranged from 76% less to 337% greater than tower counts (Table 3, Figure 4). The final daily travel time analysis estimate of 10,005 sockeye salmon on 11 July had a percent error of 95% greater than the 1.5 d lag tower count of 5,121 (12-13 July). Our best performing ERF occurred on 28 June with an estimated 72,558 fish inriver compared to the 1.5 d observed escapement of 76,194, resulting in a percent error of -5% (Table 3).

Accuracy (MAPE) and bias (MPE) for travel time analysis test fish inriver fish abundance estimates compared to tower counts were 60% and 14% respectively (Table 3). For the Egegik River, the published forecast and straight travel time model followed a similar trend with the greatest errors associated with marked increase in catch rates on 1-2 July (Figure 5).

Test fishing began 22 June and ended 13 July. A total of 2,140 sockeye salmon were caught producing a cumulative index of 21,803 (Table 4, Appendix A.3). Similar to Kvichak, the preseason calculated FPI of 45 based on the time series analysis was determined to be high and downgraded. A six-year mean of season ending FPI's from years with the lowest water velocity measurements at Ugashik Smolt resulted in an FPI of 31. This value was used for test fish inriver fish abundance estimates for 22-28 June (Table 4). Sufficient spawning escapement data were collected by 29 June to allow estimation of FPI values based on travel time. Estimated travel times during this period ranged from 2 to 2.5 d. On the last day of project operation, the best estimate of travel time was 2 d and the FPI was 32 (Table 4, Appendix B.3). A complete summary of catch by day, species and fishing time at the Ugashik River test fish project is presented in Appendix C.3.

Daily inriver fish abundance estimates based on daily travel time analysis (29 June-13 July) ranged from 78% less to 21% greater than visual counts from towers (Table 4, Figure 6). The final daily travel time analysis estimate of 3,143 sockeye salmon on 13 July had a percent error of 78% less than the 2 d lag tower count of 14,616 (14-15 July). Our best performing ERF occurred on 2 July with an estimated 151,171 fish inriver compared to the 2.5 d observed escapement of 150,948, resulting in a percent error of nearly 0% (Table 4).

Accuracy (MAPE) and bias (MPE) for travel time analysis test fish inriver fish abundance estimates compared to lagged tower counts were 21% and -13% respectively (Table 4). For Ugashik River, the published method provided similar but lower errors than the travel time approach. The greatest errors were associated with higher than expected passage rates (Figure 7).

DISCUSSION

The Bristol Bay river test fish pre-season mean FPI's performed poorly on all rivers in 2003. The mean FPI value was high for all three rivers (Appendices B.1-B.3). The difference was most exaggerated on Kvichak River where the preseason mean FPI was 50 and the final FPI was 29 (Table 2). The recalculated preseason FPI of 31 on the Ugashik River came closest to its season ending FPI of 32 (Table 4). Egegik River's preseason mean FPI of 70 was the only one that we did not change inseason and ended at 59 (Table 3). The greatest variability of FPI's using lag time relationships occurred on the Egegik River where it ranged from 28 to 62 (Table 3.).

Two factors may have caused the large errors associated with the published ERF estimates on the Kvichak and Egegik, Rivers: 1) large surges of fish on the Kvichak and 2) gillnet saturation on the Egegik. The two greatest errors in our ERF estimates on the Kvichak River were associated with a sudden increase in catch rate. Both models indicated that travel time and FPI dropped

7

when in actuality travel time increased and FPI increased causing overestimation of our ERF's. On each occasion the increased passage rate driving the travel time down was only observed for one day, preventing the density needed to drive the fish upriver and lowering the travel time as the models indicated.

We grossly underestimated the number of fish inriver on the Egegik River from 29 June-3 July (Figure 4). Catch rate was high on 25-27 June producing strong index values but dropped on 29 and 30 June with only the evening drifts catching any numbers of fish (Table 3; Appendix A.2). Catch rate increased again on 1 July for the next three days but index's were proportionally lower than index's of similar high catches from the previous drifts. Drift times during these high passage rates remained the same or increased as catches increased to as high as 100 fish per drift causing the index to be falsely low and underestimate the number of fish inriver (net saturation). Both models estimated increased travel times and higher FPI's in order to get the SSQ to fit when in reality the travel time dropped. Prior reports note that drifts should last until about 30 fish were caught or 30 min had elapsed (Bue et. al. 1988). A qualitative look at current data suggests that drift times should be shortened to keep catches under 50 fish per drift to minimize net saturation.

Historically we have done a poor job estimating our starting mean FPI's and most seasons we are inaccurate on our ERF estimates when the travel time models "lock in". We know that escapement abundance has a significant relationship with FPI (Schwanke et. al. 2003). Escapement abundance was one of the variables included to calculate the 2003 preseason mean FPI's. However, escapement is difficult to project preseason because it can be affected by total run strength, processing capabilities, management, etc. The return on all three rivers turned out to be less than expected causing our preseason mean FPI's to be too high. Early inseason indicators of run strength, run timing, and water level allowed us to downgrade both the Kvichak and Ugashik FPI's providing more accurate ERF's early on. Egegik was already using travel time before adequate inseason data was available to warrant downgrading the FPI. For the 2004 season, we will use a combination of early inseason run indicators, historical inseason FPI's, and age comp to estimate our starting mean FPI's.

LTERATURE CITED

Bue, B.G. 1982. 1981 Kvichak, Egegik, and Ugashik escapement test fishing. Pages 33-53 in H. J. Yuen, editor. 1981 Bristol Bay salmon test fishing projects. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 72, Juneau.

Bue, B.G. 1984. 1982 Kvichak, Egegik, and Ugashik escapement test fishing. Pages 51-69 in D. M. Eggers and S. M. Fried, editors. 1982 Bristol Bay salmon test fishing projects. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 117, Juneau.

Bue B.G., and C.P. Meacham. 1981. 1980 Kvichak, Egegik, and Ugashik escapement test fishing. Pages 42-63 in H. J. Yuen, editor. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 65, Juneau.

Bue, B.G., S.M. Fried, and W.A. Bucher. 1988. Bristol Bay sockeye salmon spawning escapement test fishing in 1985. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A88-4, Anchorage.

Crawford, D.L., F.W. West, and L.F. Fair. 2002. Bristol Bay sockeye salmon inriver test fishing, 2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A02-19, Anchorage.

Fried, S.M., and B. G. Bue. 1988a. Bristol Bay sockeye salmon spawning escapement test fishing in 1987. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A88-14, Anchorage.

Fried, S.M., and B.G. Bue. 1988b. Bristol Bay sockeye salmon spawning escapement test fishing in 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2K88-11, Anchorage.

Gray, D.C., D.L. Crawford, and J.D. Miller. 1999. Bristol Bay sockeye salmon spawning escapement test fishing, 1994 – 1998. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A99-02, Anchorage.

LITERATURE CITED (Continued)

Gray, D.C. 2000. Bristol Bay sockeye salmon spawning escapement test fishing, 1999. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A00-28, Anchorage.

McBride, D.N. 1978. Igushik River inside test fishing, 1976-1978. Alaska Department of Fish and Game, Division of Commercial Fisheries, Bristol Bay Data Report 67, Anchorage.

Meacham, C.P. 1980. 1979 Kvichak, Egegik, and Ugashik inside test fishing. Pages 18-36 in H. J. Yuen, editor. 1979 Bristol Bay sockeye salmon test fishing projects. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 56, Juneau.

Paulus, R.D. 1965. Test fishing in Bristol Bay, 1960-64. Alaska Department of Fish and Game, Division of Commercial Fisheries, Informational Leaflet 67, Juneau.

Schwanke, C., F. West, L. Fair, and N. Gove. 2003. Evaluation of inriver test fishing projects, Bristol Bay, 2000-2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A03-21, Anchorage.

Stratton, B.L. 1990. Bristol Bay sockeye salmon spawning escapement test fishing in 1990. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2K90-05, Anchorage.

Stratton, B.L., and D.L. Crawford. 1994. Bristol Bay sockeye salmon spawning escapement test fishing in 1992. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fishery Report 92-2018, Anchorage.

Stratton, B.L., and D.L. Crawford. 1996. Bristol Bay sockeye salmon spawning escapement test fishing in 1993. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A96-02, Anchorage.

Stratton, B.L., and J.D. Woolington. 1992. Bristol Bay sockeye salmon spawning escapement test fishing in 1991. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fishery Report 92-15, Anchorage.

LITERATURE CITED (Continued)

Stratton, B.L., S.M. Fried, and K.A. Rowell. 1990. Bristol Bay sockeye salmon spawning escapement test fishing in 1989. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2K89-08, Anchorage.

West, F.W. 2003a. Bristol Bay sockeye salmon inriver test fishing, 2002. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A03-06, Anchorage.

West, F.W. 2003b. Abundance, age, sex, and size statistics for Pacific salmon in Bristol Bay, 2002. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A03-23, Anchorage.

West, F.W., C.J. Anderson, and D.C. Gray. 2000. Bristol Bay sockeye salmon spawning escapement test fishing, 2000. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A00-36, Anchorage.

Yuen, H.J. 1985. 1983 Kvichak, Egegik, and Ugashik escapement test fishing. Pages 28-54 in S. M. Fried, editor. 1983 Bristol Bay Pacific salmon test fishing projects. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 153, Juneau.

Yuen, H.J., S.M. Fried, and W. A. Bucher. 1985. 1984 Bristol Bay sockeye salmon escapement test fishing. Pages 39-83 in S. M. Fried, editor. 1984 Bristol Bay Pacific salmon test fishing projects. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 154, Juneau.

Yuen, H.J., S.M. Fried, and W.A. Bucher. 1988. Bristol Bay sockeye salmon spawning escapement test fishing in 1986. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A88-13, Juneau.

Table 1. Locations of Bristol Bay sockeye salmon inriver test fishing projects.

Project	Test Fishing Stations	Riverbank	GPS[a] Coordinates	
			Latitude	Longitude
Kvichak River	1	West	N 59° 01.375'	W 156° 52.565'
	2	East	N 59° 03.402'	W 156° 51.110'
Egegik River	1	South	N 58° 11.993'	W 157° 11.087'
	2	North	N 58° 12.150'	W 157° 10.465'
Ugashik River	1	East	N 57° 33.244'	W 157° 25.365'
	2	West	N 57° 33.423'	W 157° 25.554'

[a] GPS = Global Positioning System. GPS coordinates are generally considered to be accurate within 17 meters.

Table 2. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Kvichak River, 2003.

| | Test Fishing | | | | Model Estimates | | | | | | | | | Published | Observation Tower | | | Daily Percent |
| | | | | | Historical Mean FPI | | | Travel Time FPI [b] | | | Negotiated FPI [c] | | | Inriver | | | | Error of Test |
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Fish per Index Pt[a]	Forecast	Estimated River Fish	Lag	FPI[a]	Estimated River Fish	Lag	FPI[e]	Estimated River Fish	Estimate	Date	Daily Escapement	Cumulative Escapement	Fishing Estimate
6/20	65.3	0	0	0	50	0	0								6/20	d	d	
6/21	66.1	1	4	4	50	197	197								6/21	0	0	
6/22	64.5	51	208	212	35	7,434	7,416								6/22	18	18	
6/23	31.4	1	7	219	35	7,687	7,669								6/23	0	18	
6/24	57.8	10	43	262	20	5,264	4,348							4,000	6/24	888	906	
6/25 [e,i]	45.0	43	233	495	20	9,915	8,595							6,000	6/25	414	1,320	
6/26	68.8	38	135	630	20	12,600	6,354	4.0	29	12,293	2.0	21	6,994	7,000	6/26	4,926	6,246	-81
6/27	69.7	88	374	1,004				5.0	116	92,175	2.0	50	25,371	25,000	6/27	18,462	24,708	-71
6/28 [g,h]	20.9	396	5,792	6,796				2.0	68	418,718	1.0	35	195,086	200,000	6/28	18,102	42,810	179
6/29	9.4	209	5,256	12,052				1.0	17	87,216	1.0	35	309,081	300,000	6/29	69,972	112,782	81
6/30 [i]	17.6	203	2,977	15,029				1.0	24	70,086	1.5	34	227,232	225,000	6/30	171,006	283,788	39
7/01	14.4	145	3,143	18,172				2.0	34	210,116	2.0	34	204,052	200,000	7/01	130,044	413,832	8
7/02	11.3	265	5,804	23,976				2.0	32	286,114	2.0	32	286,640	280,000	7/02	66,798	480,630	-15
7/03	8.1	199	6,122	30,098				2.0	33	395,424	1.5	31	330,495	330,000	7/03	121,938	602,568	14
7/04	9.3	155	4,243	34,341				2.0	34	354,107	1.5	31	245,441	250,000	7/04	216,594	819,162	6
7/05	9.3	149	3,907	38,248				2.0	32	261,576	2.0	31	219,757	220,000	7/05	146,808	965,970	-15
7/06 [i]	24.1	302	3,213	41,461				2.0	33	234,995	1.5	32	193,440	200,000	7/06	167,394	1,133,364	33
7/07 [j]	18.3	170	2,855	44,316				2.0	32	194,435	2.0	32	192,746	180,000	7/07	92,070	1,225,434	-7
7/08 [j]	27.6	159	1,771	46,087				2.0	32	148,718	2.0	32	141,942	140,000	7/08	107,466	1,332,900	9
7/09 [k]	12.0	120	2,685	48,772				2.0	32	144,074	2.0	32	127,780	130,000	7/09	100,086	1,432,986	89
7/10	10.2	176	5,435	54,207				2.0	32	257,843	1.5	31	216,993	175,000	7/10	30,498	1,463,484	216
7/11	9.4	97	2,528	56,735				2.0	31	244,998	1.5	29	144,731	150,000	7/11	37,158	1,500,642	85
7/12	15.2	29	485	57,220				2.0	29	86,907	2.0	29	95,855	90,000	7/12	62,940	1,563,582	96
7/13															7/13	30,378	1,593,960	
7/14															7/14	18,600	1,612,560	

6/26-7/12

Mean Percent Error (MPE) 39
Mean Absolute Percent Error (MAPE) 61

[a] A preseason calculated mean FPI of 50, based on time series relationships of FPI values used within the last three to five years, was determined to be high inseason and downgraded. A mean of the last three years of season ending FPI's, resulting in an FPI of 35, was used from 22 June to 23 June. The FPI was downgraded further to 20, based on catch rates similar to last year, and was used through 25 June when lag time relationships became more accurate.
[b] Based on the best fit as determined by the lowest sums of squares value.
[c] Closest to published value based on input from manager, aerial surveys, and/or passage rates at tower.
[d] Observation towers not in operation.
[e] Missed morning drifts on 25 June. Estimated River Fish (ERF) was estimated using Index values from the morning drifts on 24 June.
[f] Only completed two of four afternoon scheduled drifts. Plane bringing in replacement crewmember late.
[g] Catch rate high on station 2 during morning drifts. Skipped last drift and interpolated by repeating station 2 index.
[h] Catch rate high on both stations during the first two evening drifts. Skipped remaining drifts and interpolated by repeating index values of previous two drifts
[i] Catch rate high on station 2 during morning drifts. Skipped last drift and interpolated by repeating station 2 index.
[j] Catch rates high at station 2 on 6, 7, and 8 July. Skipped last drift of each drifting session and interpolated each missed drift by repeating each index from first drift at station 2.
[k] Only one set of drifts were scheduled because of tide change over. Used morning drifts from July 10 to simulate evening drifts.

14

Table 3. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 2003.

| | Test Fishing | | | | Model Estimates | | | | | | | | | Published Inriver Estimate | Observation Tower | | | Daily Percent Error of Test Fishing Estimate |
| | | | | | Historical Mean FPI | | | Travel Time FPI[b] | | | Negotiated FPI[c] | | | | | | | |
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Fish per Index Pt[a]	Forecast	Estimated River Fish	Lag	FPI[a]	Estimated River Fish	Lag	FPI[a]	Estimated River Fish		Date	Daily Escapement	Cumulative Escapement	
6/15	52.8	22	110	110	70	7,711	7,711								6/15	d	d	
6/16	46.4	55	270	380	70	26,582	26,582								6/16	d	d	
6/17	47.4	67	292	671	70	47,002	47,002							45,000	6/17	d	d	
6/18	49.2	72	333	1,005	70	70,324	70,324							70,000	6/18	186	186	
6/19	46.2	106	545	1,550	70	108,500	97,898							100,000	6/19	10,416	10,602	
6/20	52.4	98	427	1,977	70	138,420	108,228	4.0	80	127,028				105,000	6/20	19,590	30,192	
6/21	51.2	57	238	2,215				4.0	58	89,064	3.0	40	49,877	50,000	6/21	8,544	38,736	32
6/22	48.0	19	91	2,306				4.0	56	73,261	3.0	38	31,060	30,000	6/22	17,826	56,562	-12
6/23	52.6	152	654	2,960				3.0	33	32,063	3.0	35	39,077	40,000	6/23	7,982	64,524	-47
6/24 [e]	52.6	152	654	3,614				3.0	35	48,280	3.0	35	50,039	55,000	6/24	11,934	76,458	-57
6/25	44.2	390	2,554	6,168				3.0	40	153,885	1.5	28	80,835	80,000	6/25	15,414	91,872	10
6/26	48.7	210	958	7,126				1.0	22	21,493	1.5	30	75,421	70,000	6/26	46,494	138,366	-15
6/27	53.1	341	1,565	8,691				3.0	53	270,033	1.5	30	68,511	65,000	6/27	53,862	192,228	-33
6/28	47.4	245	1,477	10,169				1.0	30	44,709	1.5	33	72,558	70,000	6/28	70,782	263,010	-5
6/29	53.6	49	223	10,391				1.0	32	7,118	2.0	37	59,345	60,000	6/29	62,124	325,134	-57
6/30	53.0	131	646	11,038				1.0	34	21,971	2.0	36	55,117	50,000	6/30	28,140	353,274	-76
7/01	52.7	317	1,444	12,482				3.0	46	105,714	3.0	46	109,487	105,000	7/01	111,414	464,688	-74
7/02	49.1	416	2,211	14,693				4.0	57	258,096	3.0	56	242,656	240,000	7/02	115,446	580,134	-46
7/03	48.3	371	1,868	16,561				1.0	49	92,424	1.5	54	167,269	170,000	7/03	146,868	727,002	-29
7/04	50.7	166	720	17,280				1.0	54	38,828	1.5	58	108,966	110,000	7/04	166,296	893,298	-29
7/05	57.6	135	522	17,803				1.0	60	31,227	2.0	62	70,430	70,000	7/05	140,034	1,033,332	33
7/06	66.6	76	261	18,063				1.0	60	15,513	1.5	61	42,551	30,000	7/06	25,980	1,059,312	15
7/07	64.5	144	483	18,546				1.0	60	29,055	1.5	61	44,979	35,000	7/07	27,042	1,086,354	92
7/08	58.4	71	268	18,814				1.0	60	15,954	1.5	61	41,697	30,000	7/08	19,602	1,105,956	137
7/09	59.0	58	206	19,020				1.0	59	12,203	1.5	60	27,530	20,000	7/09	7,722	1,113,678	18
7/10	31.6	77	531	19,552				1.0	60	31,665	1.0	60	31,665	30,000	7/10	19,680	1,133,358	337
7/11	45.9	23	117	19,668				1.0	58	6,821	1.5	59	10,005	10,000	7/11	7,242	1,140,600	95
7/12															7/12	3,474	1,144,074	
7/13															7/13	3,294	1,147,368	

6/21 - 7/11			Mean Percent Error (MPE)	14
			Mean Absoluta Percent Error (MAPE)	60

[a] A starting FPI of 70, based on a model that incorporated average length, age composition, escapement, and time series analysis, was used through 20 June. Thereafter, FPI's were based on lag-time relationships.

[b] Based on the best fit as determined by the lowest sums of squares value.

[c] Closest to published value based on input from manager, aerial surveys, and/or passage rates at tower.

[d] Observation towers not in operation.

[e] Missed both drift sessions on 24 June because boat sank with previous evenings incoming tide. Interpolated these data by replacing missed drifts with index's from 23 June.

Table 4. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 2003.

	Test Fishing				Model Estimates									Published Inriver Estimate	Observation Tower			Daily Percent Error of Test Fishing Estimate
					Historical Mean FPI			Travel Time FPI [b]			Negotiated FPI [c]							
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Fish per Index Pt	Forecast	Estimated River Fish	Lag	FPI[a]	Estimated River Fish	Lag	FPI[a]	Estimated River Fish		Date	Daily Escapement	Cumulative Escapement	
6/22	57.3	5	21	21	31	651	651									[d]	[d]	
6/23	50.8	9	43	64	31	1974	1974									[d]	[d]	
6/24	55.8	11	44	108	31	3,352	3,352							3,000		[d]	[d]	
6/25	21.2	7	81	189	31	5,854	5,854							6,000		[d]	[d]	
6/26	43.0	40	240	429	31	13,299	13,299							13,000		[d]	[d]	
6/27	31.0	126	1,117	1,546	31	47,920	47,920							45,000		[d]	[d]	
6/28	26.1	132	1,215	2,761	31	85,576	79,618							70,000	6/28 [e]	5,958	5,958	
6/29	29.9	129	1,063	3,824	31	118,532	78,172	2.0	26	59,472	2.0	30	74,360	70,000	6/29	30,360	36,318	18
6/30 [e]	23.9	246	2,923	6,746				2.0	22	87,768	2.0	24	101,120	100,000	6/30	20,424	56,742	1
7/1	21.7	221	2,479	9,225				1.0	15	37,782	2.0	27	145,389	145,000	7/1	42,570	99,312	21
7/2 [f]	26.2	126	1,182	10,407				1.0	17	20,620	2.5	30	151,171	150,000	7/2	57,324	156,636	0
7/3	29.8	164	1,271	11,678				2.0	26	64,445	2.0	26	64,445	65,000	7/3	62,508	219,144	-48
7/4	22.0	221	2,530	14,208				2.0	27	100,829	2.0	28	121,730	120,000	7/4	52,914	272,058	-14
7/5 [g]	19.6	238	2,889	17,097				2.0	30	161,096	2.5	31	182,865	190,000	7/5	71,052	343,110	-4
7/6 [h]	25.1	158	1,527	18,624				2.0	29	129,758	2.0	29	129,758	130,000	7/6	70,356	413,466	-17
7/7	24.4	127	1,288	19,912				2.0	29	82,303	2.5	31	117,308	110,000	7/7	82,452	495,918	-23
7/8	24.9	85	857	20,768				2.0	31	66,050	2.5	32	90,963	90,000	7/8	73,668	569,586	-14
7/9	28.3	45	430	21,198				2.0	32	40,918	2.5	33	66,023	60,000	7/9	63,924	633,510	11
7/10	14.4	16	265	21,463				2.0	32	22,135	2.0	32	24,839	25,000	7/10	28,464	661,974	-31
7/11	24.3	23	243	21,706				2.0	32	16,479	2.0	32	16,479	15,000	7/11	25,704	687,678	13
7/12	25.9	6	55	21,761				2.0	32	9,682	2.0	32	9,682	10,000	7/12	10,512	698,190	-28
7/13	27.3	5	43	21,803				2.0	32	3,143	2.0	32	3,143	3,000	7/13	4,086	702,276	-78
7/14															7/14	9,294	711,570	
7/15															7/15	5,322	716,892	

6/29 - 7/13		Mean Percent Error (MPE)	-13
		Mean Absolute Percent Error (MAPE)	21

[a] A preseason calculated mean FPI of 45, based on time series relationships of FPI values used within the last three to five years, was determined to be high inseason and downgraded.
A six-year mean of season ending FPI's from years with the lowest water velocity measurements at Ugashik Smolt resulted in an FPI of 31. This value was used
through 28 June when lag time relationships became more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information.

[c] Closest to published value based on input from manager, aerial surveys, and/or passage rates at tower.

[d] Observation towers not in operation.

[e] The daily escapement value was doubled to 10,000 to estimate ERF's from June 29 - July 8. Counts began at noon on June 28.

[f] Missed morning drifts on 2 July because of high wind and waves. Interpolated these data by averaging mean fishing time and catch from the morning drifts on 1 July and evening drifts on 2 July.

[g] Missed last drift at station 2 because of a problem with steering system on the skiff. Interpolated missed drift by repeating previous station 2 index.

[h] Missed morning drifts on 6 July because of a problem with steering system on the skiff. Interpolated these data by averaging mean fishing time and catch from the morning drifts on 5 July
and evening drifts on 6 July.

16
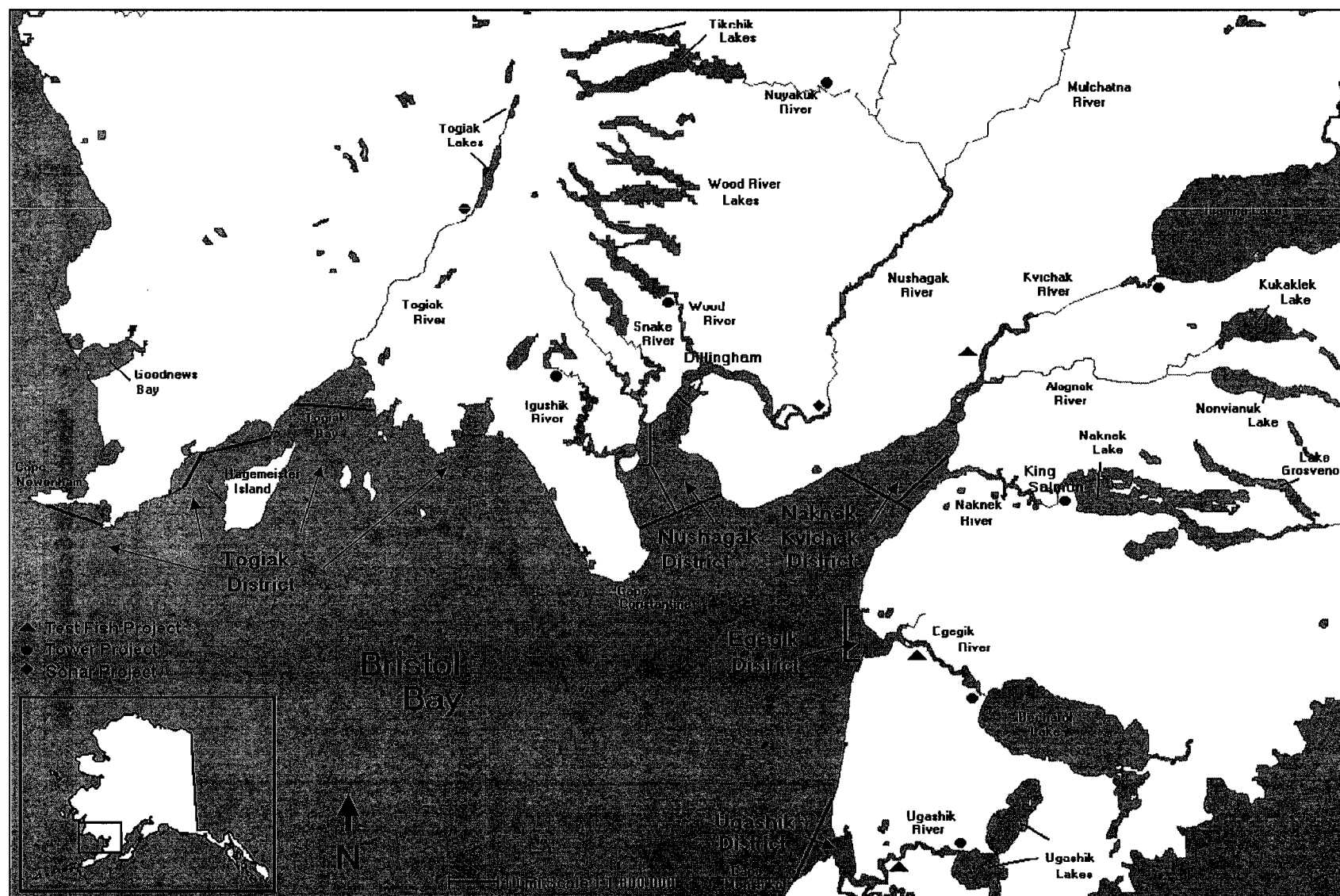
Figure 1.   Major river systems, commercial salmon fishing districts, and escapement projects in Bristol Bay.
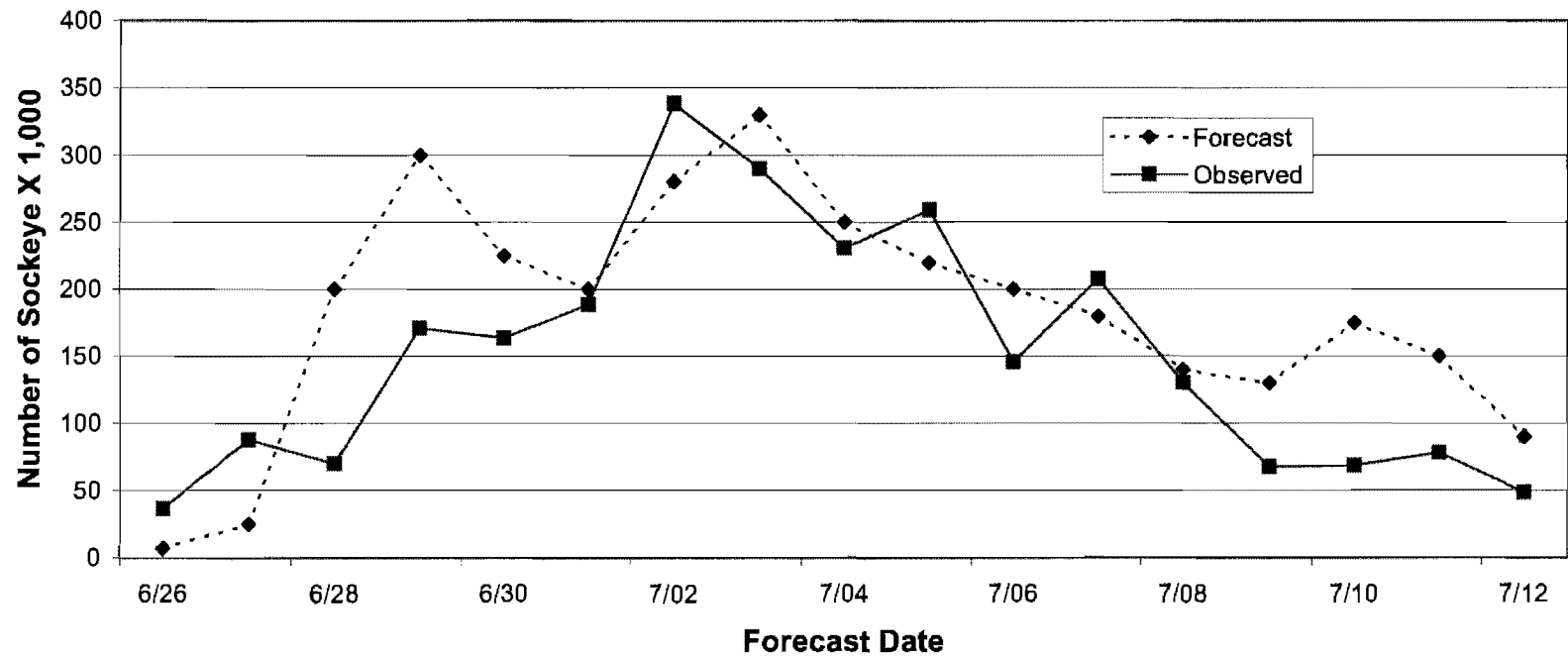
Figure 2. Comparison of inseason daily sockeye salmon test fish forecast and lagged observed escapement, Kvichak River, 2003.
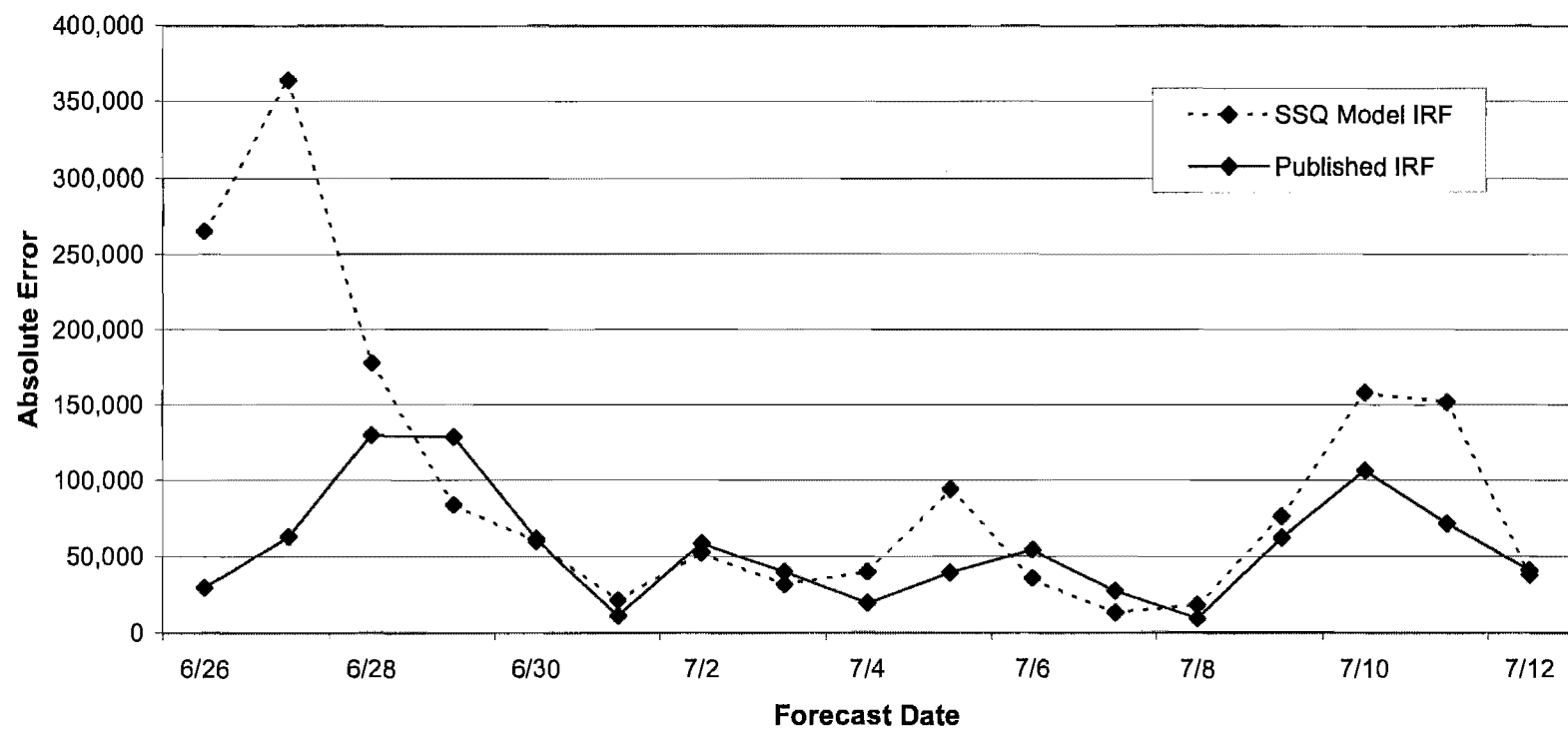
Figure 3. Comparison of the absolute errors between the SSQ Model IRF and the Published IRF methods, Kvichak River, 2003.
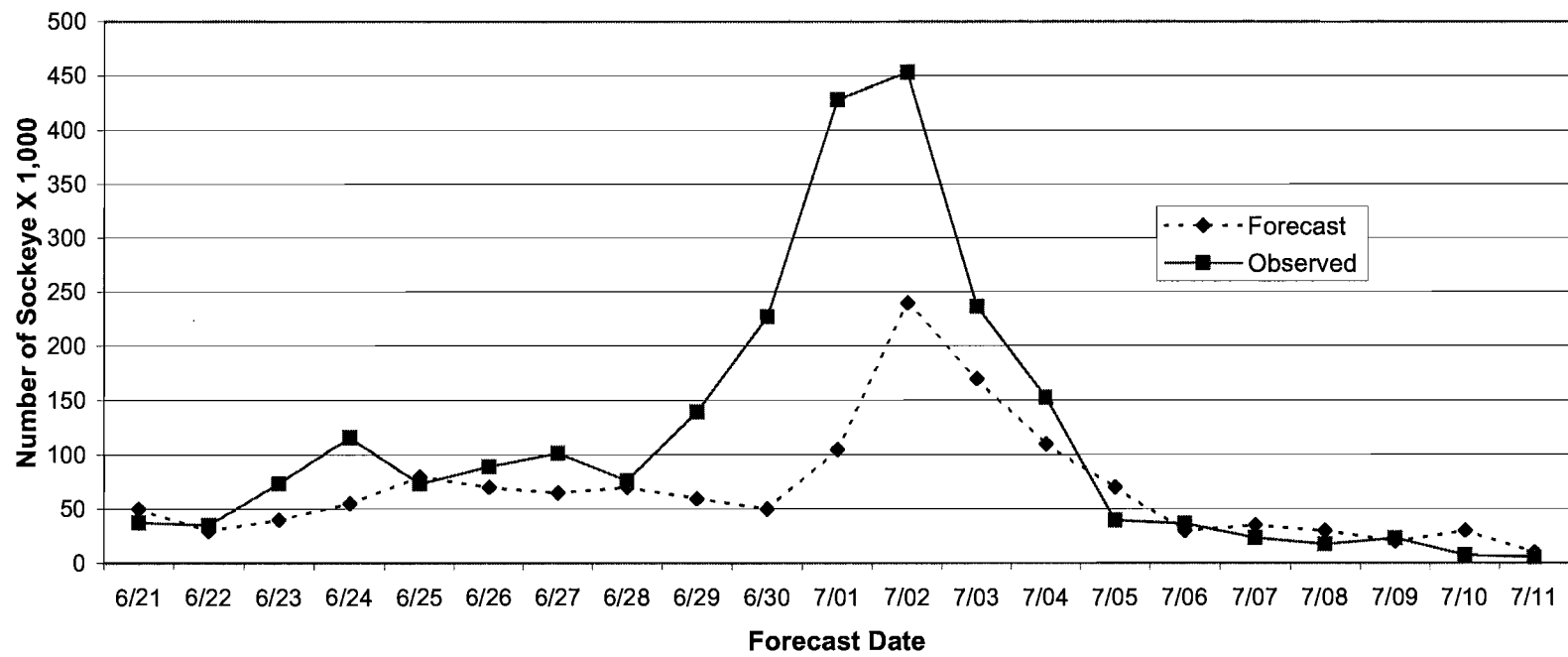
Figure 4. Comparison of inseason daily sockeye salmon test fish forecast and lagged observed escapement, Egegik River, 2003.
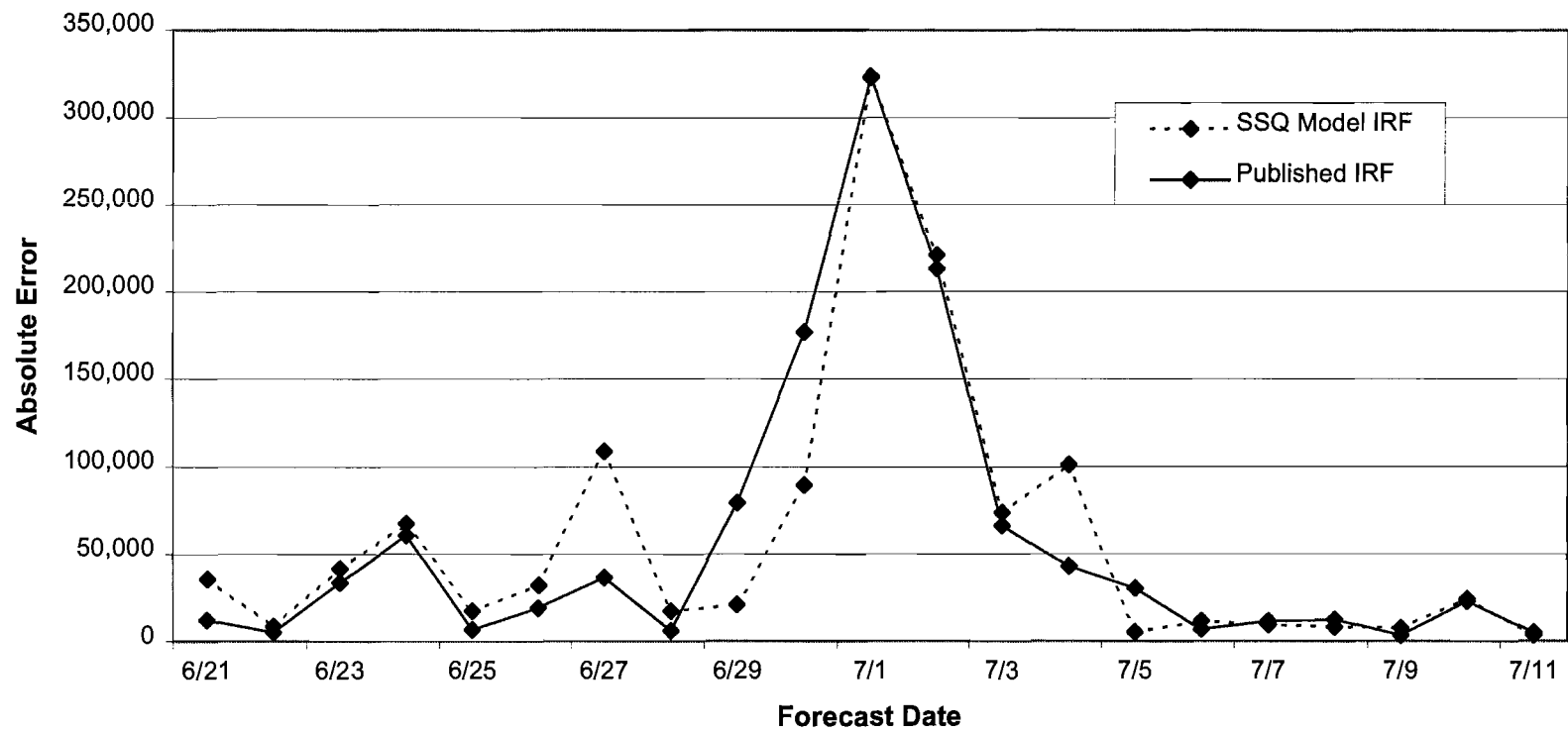
Figure 5. Comparison of the absolute errors between the SSQ Model IRF and the Published IRF methods, Egegik River, 2003.
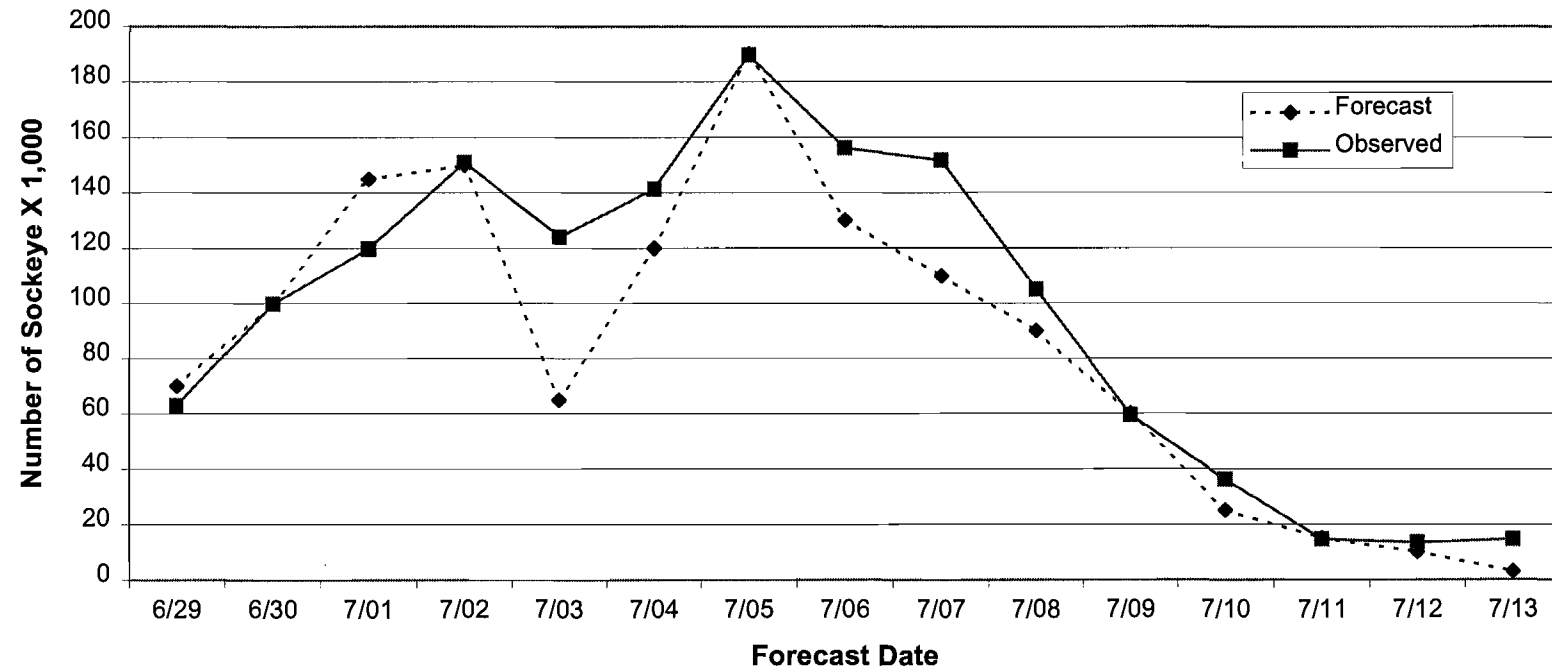
Figure 6. Comparison of inseason daily sockeye salmon test fish forecast and lagged observed escapement, Ugashik River, 2003.
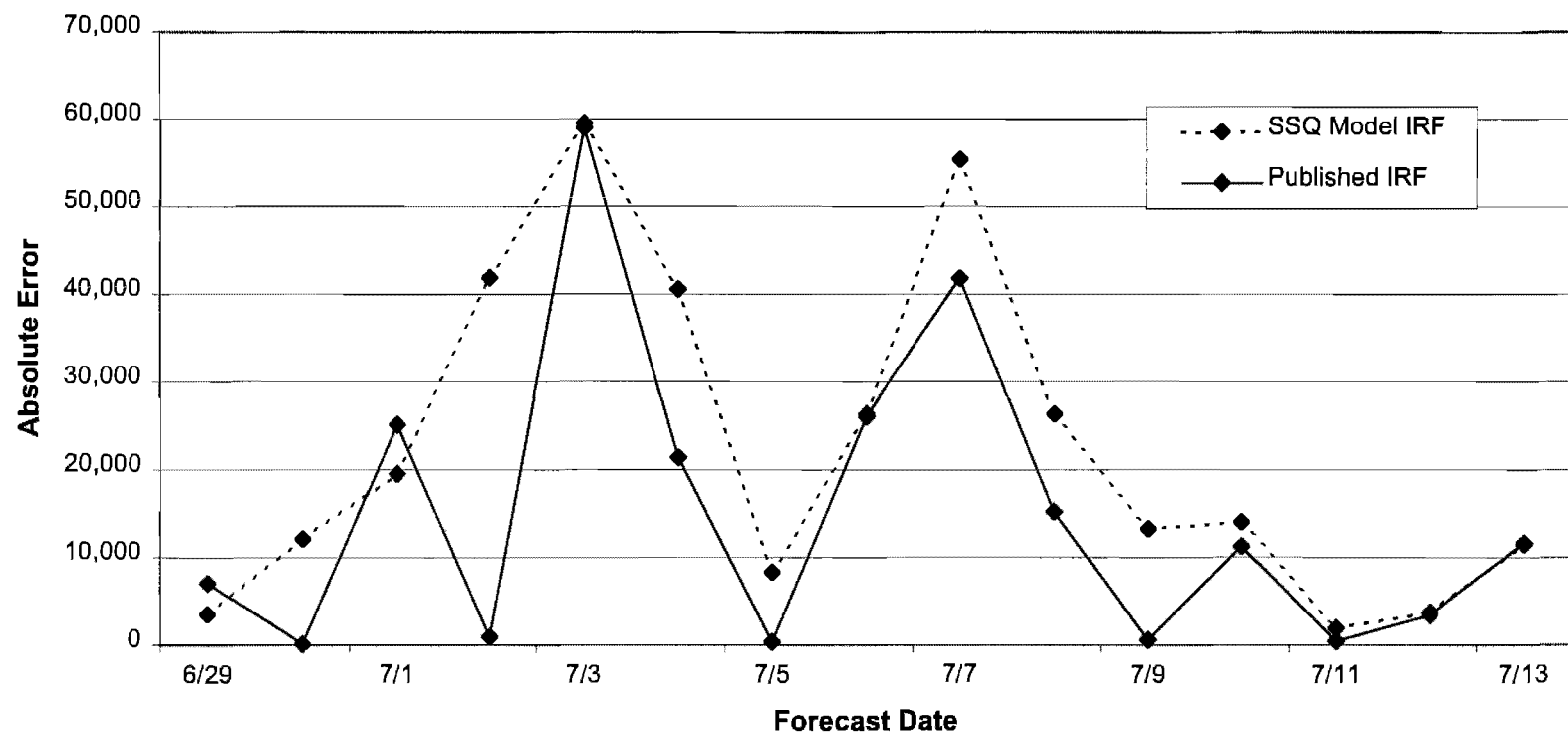
Figure 7. Comparison of the absolute errors between the SSQ Model IRF and the Published IRF methods, Ugashik River, 2003.

Appendix A.1. Sockeye salmon inriver test fishing data, Kvichak River, 2003.

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
6/20	1	1	7.5	0	0	
6/20	2	1	7.5	0	0	
6/20	3	2	9.3	0	0	
6/20	4	2	9.1	0	0	
6/20	5	1	7.9	0	0	
6/20	6	1	8.4	0	0	
6/20	7	2	8.2	0	0	
6/20	8	2	7.4	0	0	
Daily			65.3	0	0	13.0
6/21	9	1	8.0	0	0	
6/21	10	1	8.2	0	0	
6/21	11	2	7.6	1	32	
6/21	12	2	8.4	0	0	
6/21	13	1	8.0	0	0	
6/21	14	1	8.4	0	0	
6/21	15	2	8.7	0	0	
6/21	16	2	8.8	0	0	
Daily			66.1	1	4	13.0
6/22	17	1	8.6	0	0	
6/22	18	1	8.3	1	29	
6/22	19	2	8.7	0	0	
6/22	20	2	7.8	1	31	
6/22	21	1	8.2	0	0	
6/22	22	1	8.2	0	0	
6/22	23	2	6.9	25	870	
6/22	24	2	7.8	24	738	
Daily			64.5	51	208	12.0
6/23	25	1	7.7	0	0	
6/23	26	1	7.0	0	0	
6/23	27	2	8.4	0	0	
6/23	28	2	8.3	1	29	
Daily			31.4	1	7	12.0
6/24	29	1	5.6	1	43	
6/24	30	1	7.3	4	132	
6/24	31	2	7.4	0	0	
6/24	32	2	9.5	0	0	
6/24	33	1	6.4	1	38	
6/24	34	1	6.5	1	37	
6/24	35	2	7.6	1	32	
6/24	36	2	7.5	2	64	
Daily			57.8	10	43	11.0
6/25	37 [a]		5.6	1	43	
6/25	38 [a]		7.3	4	132	
6/25	39 [a]		7.4	0	0	
6/25	40 [a]		9.5	0	0	
6/25	41 [b]	1	7.8	5	154	
6/25	42 [b]	2	7.4	33	1,070	
Daily			45.0	43	233	12.0

-Continued-

25

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
6/26	43	1	8.2	1	29	
6/26	44	1	8.6	0	0	
6/26	45	2	9.3	0	0	
6/26	46	2	8.7	0	0	
6/26	47	1	8.4	2	57	
6/26	48	1	9.4	2	51	
6/26	49	2	6.8	10	353	
6/26	50	2	9.4	23	587	
Daily			68.8	38	135	12.0
6/27	51	1	10.2	0	0	
6/27	52	1	9.6	0	0	
6/27	53	2	10.6	6	136	
6/27	54	2	9.7	1	25	
6/27	55	1	8.5	8	226	
6/27	56	1	9.4	0	0	
6/27	57	2	8.0	61	1,830	
6/27	58	2	3.7	12	778	
Daily			69.7	88	374	12.0
6/28	59	1	5.1	18	847	
6/28	60	1	3.6	20	1,333	
6/28	61	2	2.1	65	7,429	
6/28	62 [c]		2.1	65	7,429	
6/28	63	1	2.4	49	4,900	
6/28	64	2	1.6	65	9,750	
6/28	65 [d]		2.4	49	4,900	
6/28	66 [d]		1.6	65	9,750	
Daily			20.9	396	5,792	12.0
6/29	67	1	2.1	20	2,286	
6/29	68	2	2.2	59	6,436	
6/29	69	1	2.6	48	4,431	
6/29	70	2	2.5	82	7,872	
Daily			9.4	209	5,256	13.0
6/30	71	1	4.1	5	293	
6/30	72	1	2.3	10	1,043	
6/30	73	2	3.1	41	3,174	
6/30	74 [e]		3.1	41	3,174	
6/30	75	1	2.5	23	2,208	
6/30	76	2	2.5	83	7,968	
Daily			17.6	203	2,977	14.0
7/01	77	1	4.8	10	500	
7/01	78	2	5.3	41	1,857	
7/01	79	1	2.0	26	3,120	
7/01	80	2	2.3	68	7,096	
Daily			14.4	145	3,143	15.0

-Continued-

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
7/02	81	1	3.0	32	2,560	
7/02	82	2	3.0	77	6,160	
7/02	83	1	2.9	64	5,297	
7/02	84	2	2.4	92	9,200	
Daily			11.3	265	5,804	14.0
7/03	85	1	2.1	24	2,743	
7/03	86	2	1.9	50	6,316	
7/03	87	1	2.2	21	2,291	
7/03	88	2	1.9	104	13,137	
Daily			8.1	199	6,122	13.0
7/04	89	1	2.6	19	1,754	
7/04	90	2	2.3	51	5,322	
7/04	91	1	2.6	35	3,231	
7/04	92	2	1.8	50	6,667	
Daily			9.3	155	4,243	13.0
7/05	93	1	2.6	34	3,138	
7/05	94	2	2.4	42	4,200	
7/05	95	1	2.3	30	3,130	
7/05	96	2	2.0	43	5,160	
Daily			9.3	149	3,907	13.0
7/06	97	1	3.1	14	1,084	
7/06	98	1	2.6	19	1,754	
7/06	99	2	2.8	57	4,886	
7/06	100 [f]		2.8	57	4,886	
7/06	101	1	3.1	3	232	
7/06	102	1	4.1	6	351	
7/06	103	2	2.8	73	6,257	
7/06	104 [f]		2.8	73	6,257	
Daily			24.1	302	3,213	13.0
7/07	105	1	3.6	17	1,133	
7/07	106	2	3.2	45	3,375	
7/07	107	1	3.6	3	200	
7/07	108	1	3.9	3	185	
7/07	109	2	2.0	51	6,120	
7/07	110 [f]		2.0	51	6,120	
Daily			18.3	170	2,855	13.0
7/08	111	1	4.3	3	167	
7/08	112	1	3.3	2	145	
7/08	113	2	2.4	56	5,600	
7/08	114 [f]		2.4	56	5,600	
7/08	115	1	2.8	0	0	
7/08	116	1	4.8	0	0	
7/08	117	2	3.8	21	1,326	
7/08	118 [f]		3.8	21	1,326	
Daily			27.6	159	1,771	15.0

-Continued-

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
7/09	119	1	3.1	12	929	
7/09	120	2	2.4	66	6,600	
7/09	121 g		3.5	13	891	
7/09	122 g		3.0	29	2,320	
Daily			12.0	120	2,685	15.0
7/10	123	1	3.5	13	891	
7/10	124	2	3.0	29	2,320	
7/10	125	1	2.1	44	5,029	
7/10	126	2	1.6	90	13,500	
Daily			10.2	176	5,435	14.0
7/11	127	1	2.1	14	1,600	
7/11	128	2	2.4	24	2,400	
7/11	129	1	2.9	26	2,152	
7/11	130	2	2.0	33	3,960	
Daily			9.4	97	2,528	14.0
7/12	131	1	3.1	7	542	
7/12	132	2	2.9	9	745	
7/12	133	1	3.9	4	246	
7/12	134	2	5.3	9	408	
Daily			15.2	29	485	13.0
Max			10.6	104	13,500	15.0
Mean			5.1	22	2,143	13.1
Min			1.6	0	0	11.0

[a] Missed Set No.'s 37 through 40. Interpolated these data using index values from June 24 Set No.'s 29 through 32.

[b] Only completed two of four scheduled drifts. Plane bringing in replacement crewmember late.

[c] Catch rate high on station 2. Skipped last drift and interpolated missed drift by repeating index from Set No. 61.

[d] Catch rate high for Set No.'s 63 and 64. Skipped remaining drifts and interpolated missed drifts by using index from Set No.'s 63 and 64.

[e] Catch rate high on station 2. Skipped last drift and interpolated missed drift by repeating index from Set No. 73.

[f] Catch rates high on station 2 for July 6, 7, and 8. Skipped last drift of each drifting session and interpolated each missed drift by repeating index from Set No.'s 99, 103, 109, 113, and 117, respectively.

[g] Only one set of drifts were scheduled because of tide change over. Used morning drifts from July 10 to simulate evening drifts.

Appendix A.2. Sockeye salmon inriver test fishing data, Egegik River, 2003.

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
6/15	1	1	9.1	0	0	
6/15	2	2	6.3	1	38	
6/15	3	1	5.5	0	0	
6/15	4	2	9.0	0	0	
6/15	5	1	5.5	0	0	
6/15	6	2	5.5	3	131	
6/15	7	1	5.8	2	83	
6/15	8	2	6.1	16	630	
Daily			52.8	22	110	11.0
6/16	9	1	5.1	0	0	
6/16	10	2	5.8	0	0	
6/16	11	1	5.8	1	41	
6/16	12	2	5.0	1	48	
6/16	13	1	6.1	9	354	
6/16	14	2	6.3	26	990	
6/16	15	1	6.4	3	113	
6/16	16	2	5.9	15	610	
Daily			46.4	55	270	12.0
6/17	17	1	5.5	0	0	
6/17	18	2	5.4	0	0	
6/17	19	1	5.6	0	0	
6/17	20	2	5.6	0	0	
6/17	21	1	5.8	2	83	
6/17	22	2	7.0	36	1,234	
6/17	23	1	5.6	1	43	
6/17	24	2	6.9	28	974	
Daily			47.4	67	292	13.0
6/18	25	1	5.8	2	83	
6/18	26	2	5.8	1	41	
6/18	27	1	5.5	0	0	
6/18	28	2	6.0	3	120	
6/18	29	1	5.8	12	497	
6/18	30	2	6.8	15	529	
6/18	31	1	6.5	22	812	
6/18	32	2	7.0	17	583	
Daily			49.2	72	333	13.0
6/19	33	1	5.8	1	41	
6/19	34	2	5.3	6	272	
6/19	35	1	5.5	1	44	
6/19	36	2	5.8	4	166	
6/19	37	1	6.0	10	400	
6/19	38	2	5.3	38	1,721	
6/19	39	1	6.0	7	280	
6/19	40	2	6.5	39	1,440	
Daily			46.2	106	545	13.0

-Continued-

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
6/20	41	1	5.5	0	0	
6/20	42	2	7.8	7	215	
6/20	43	1	7.4	2	65	
6/20	44	2	6.4	13	488	
6/20	45	1	6.3	0	0	
6/20	46	2	5.8	18	745	
6/20	47	1	5.9	0	0	
6/20	48	2	7.3	58	1,907	
Daily			52.4	98	427	12.0
6/21	49	1	5.8	0	0	
6/21	50	2	7.9	0	0	
6/21	51	1	5.5	0	0	
6/21	52	2	5.4	1	44	
6/21	53	1	6.1	1	39	
6/21	54	2	7.0	26	891	
6/21	55	1	6.0	0	0	
6/21	56	2	7.5	29	928	
Daily			51.2	57	238	11.0
6/22	57	1	5.4	1	44	
6/22	58	2	6.1	3	118	
6/22	59	1	5.6	0	0	
6/22	60	2	7.6	2	63	
6/22	61	1	5.5	0	0	
6/22	62	2	6.0	6	240	
6/22	63	1	5.3	0	0	
6/22	64	2	6.5	7	258	
Daily			48.0	19	91	11.0
6/23	65	1	5.8	9	372	
6/23	66	2	6.5	38	1,403	
6/23	67	1	5.9	9	366	
6/23	68	2	7.1	44	1,487	
6/23	69	1	6.4	0	0	
6/23	70	2	6.3	0	0	
6/23	71	1	6.3	11	419	
6/23	72	2	8.3	41	1,186	
Daily			52.6	152	654	12.0
6/24	73	a	5.8	9	372	
6/24	74	a	6.5	38	1,403	
6/24	75	a	5.9	9	366	
6/24	76	a	7.1	44	1,487	
6/24	77	a	6.4	0	0	
6/24	78	a	6.3	0	0	
6/24	79	a	6.3	11	419	
6/24	80	a	8.3	41	1,186	
Daily			52.6	152	654	11.0

-Continued-

30

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
6/25	81	1	6.3	19	724	
6/25	82	2	6.3	15	571	
6/25	83	1	6.0	15	600	
6/25	84	2	6.3	15	571	
6/25	85	1	7.3	78	2,564	
6/25	86	2	6.0	111	4,440	
6/25	87	1	3.0	73	5,840	
6/25	88	2	3.0	64	5,120	
Daily			44.2	390	2,554	
6/26	89	1	5.3	13	589	
6/26	90	2	6.6	47	1,709	
6/26	91	1	5.5	9	393	
6/26	92	2	7.0	73	2,503	
6/26	93	1	6.8	56	1,976	
6/26	94	2	5.6	5	214	
6/26	95	1	5.6	3	129	
6/26	96	2	6.3	4	152	
Daily			48.7	210	958	12.0
6/27	97	1	6.5	3	111	
6/27	98	2	7.8	48	1,477	
6/27	99	1	6.8	9	318	
6/27	100	2	7.3	57	1,874	
6/27	101	1	7.1	58	1,961	
6/27	102	2	6.0	64	2,560	
6/27	103	1	5.8	72	2,979	
6/27	104	2	5.8	30	1,241	
Daily			53.1	341	1,565	11.0
6/28	105	1	6.5	17	628	
6/28	106	2	6.6	9	327	
6/28	107	1	7.5	8	256	
6/28	108	2	6.8	28	988	
6/28	109	1	4.8	60	3,000	
6/28	110	2	3.8	42	2,653	
6/28	111	1	4.5	62	3,307	
6/28	112	2	6.9	19	661	
Daily			47.4	245	1,477	12.0
6/29	113	1	5.9	0	0	
6/29	114	2	6.0	1	40	
6/29	115	1	7.5	0	0	
6/29	116	2	6.8	1	35	
6/29	117	1	6.8	19	671	
6/29	118	2	6.3	22	838	
6/29	119	1	7.8	4	123	
6/29	120	2	6.5	2	74	
Daily			53.6	49	223	14.0

-Continued-

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
6/30	121	1	6.4	0	0	
6/30	122	2	7.8	4	123	
6/30	123	1	7.5	1	32	
6/30	124	2	7.0	9	309	
6/30	125	1	4.8	24	1,200	
6/30	126	2	7.0	34	1,166	
6/30	127	1	5.5	34	1,484	
6/30	128	2	7.0	25	857	
Daily			53.0	131	646	13.0
7/01	129	1	5.8	4	166	
7/01	130	2	7.3	18	592	
7/01	131	1	6.5	10	369	
7/01	132	2	7.5	60	1,920	
7/01	133	1	6.6	31	1,127	
7/01	134	2	5.1	54	2,541	
7/01	135	1	5.9	60	2,441	
7/01	136	2	8.0	80	2,400	
Daily			52.7	317	1,444	16.0
7/02	137	1	6.4	1	38	
7/02	138	2	7.3	63	2,071	
7/02	139	1	7.4	9	292	
7/02	140	2	7.4	73	2,368	
7/02	141	1	5.5	48	2,095	
7/02	142	2	4.5	90	4,800	
7/02	143	1	5.6	61	2,614	
7/02	144	2	5.0	71	3,408	
Daily			49.1	416	2,211	15.0
7/03	145	1	6.0	13	520	
7/03	146	2	6.5	73	2,695	
7/03	147	1	5.9	9	366	
7/03	148	2	5.5	64	2,793	
7/03	149	1	6.8	61	2,153	
7/03	150	2	5.5	62	2,705	
7/03	151	1	5.3	57	2,581	
7/03	152	2	6.8	32	1,129	
Daily			48.3	371	1,868	13.0
7/04	153	1	5.4	0	0	
7/04	154	2	6.9	20	696	
7/04	155	1	4.8	1	50	
7/04	156	2	7.6	20	632	
7/04	157	1	7.1	47	1,589	
7/04	158	2	6.8	69	2,435	
7/04	159	1	6.1	4	157	
7/04	160	2	6.0	5	200	
Daily			50.7	166	720	13.0

-Continued-

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
7/05	161	1	7.3	2	66	
7/05	162	2	6.3	11	419	
7/05	163	1	5.8	2	83	
7/05	164	2	6.6	12	436	
7/05	165	1	7.8	30	923	
7/05	166	2	7.0	20	686	
7/05	167	1	7.5	11	352	
7/05	168	2	9.3	47	1,213	
Daily			57.6	135	522	14.0
7/06	169	1	7.1	1	34	
7/06	170	2	8.3	18	520	
7/06	171	1	7.5	1	32	
7/06	172	2	8.8	26	709	
7/06	173	1	7.9	6	182	
7/06	174	2	9.5	9	227	
7/06	175	1	7.7	2	62	
7/06	176	2	9.8	13	318	
Daily			66.6	76	261	13.0
7/07	177	1	6.5	2	74	
7/07	178	2	8.3	15	434	
7/07	179	1	7.5	1	32	
7/07	180	2	8.3	19	549	
7/07	181	1	8.0	3	90	
7/07	182	2	9.5	63	1,592	
7/07	183	1	7.3	2	66	
7/07	184	2	9.1	39	1,029	
Daily			64.5	144	483	14.0
7/08	185	1	7.0	2	69	
7/08	186	2	8.3	20	578	
7/08	187	1	6.5	2	74	
7/08	188	2	8.6	23	642	
7/08	189	1	6.6	1	36	
7/08	190	2	7.0	8	274	
7/08	191	1	6.6	1	36	
7/08	192	2	7.8	14	431	
Daily			58.4	71	268	14.5
7/09	193	1	8.3	6	173	
7/09	194	2	9.5	19	480	
7/09	195	1	8.0	2	60	
7/09	196	2	9.8	20	490	
7/09	201	1	6.0	1	40	
7/09	202	2	6.1	5	197	
7/09	203	1	5.5	1	44	
7/09	204	2	5.8	4	166	
Daily			59.0	58	206	15.0

-Continued-

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
7/10	205	1	7.0	6	206	
7/10	206	2	8.5	23	649	
7/10	207	1	6.0	8	320	
7/10	208	2	10.1	40	950	
Daily			31.6	77	531	15.0
7/11	209	1	4.4	0	0	
7/11	210	2	5.8	1	41	
7/11	211	1	5.8	1	41	
7/11	212	2	6.0	0	0	
7/11	213	1	6.3	4	152	
7/11	214	2	5.3	6	272	
7/11	215	1	6.0	5	200	
7/11	216	2	6.3	6	229	
Daily			45.9	23	117	13.0
Max			10.1	111	5,840	16.0
Mean			6.5	19	732	12.9
Min			3.0	0	0	11.0

[a] Missed Set No.'s 73 through 80 because boat sank with incoming tide.
   Interpolated these data by replacing missed drifts with index's from Set No.'s 65 - 72.

34

Appendix A.3. Sockeye salmon inriver test fishing data, Ugashik River, 2003.

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
6/22	1	1	6.3	0	0	
6/22	2	1	7.4	1	32	
6/22	3	2	7.3	1	33	
6/22	4	2	7.4	0	0	
6/22	5	1	7.5	0	0	
6/22	6	1	7.5	1	32	
6/22	7	2	6.5	1	37	
6/22	8	2	7.4	1	32	
Daily			57.3	5	21	12.0
6/23	9	1	6.0	1	40	
6/23	10	1	6.4	1	38	
6/23	11	2	6.4	0	0	
6/23	12	2	6.8	1	35	
6/23	13	1	6.8	4	141	
6/23	14	1	7.1	0	0	
6/23	15	2	5.9	0	0	
6/23	16	2	5.4	2	89	
Daily			50.8	9	43	11.3
6/24	17	1	7.4	1	32	
6/24	18	1	7.4	0	0	
6/24	19	2	7.4	5	162	
6/24	20	2	7.4	1	32	
6/24	21	1	9.0	1	27	
6/24	22	1	3.3	0	0	
6/24	23	2	6.5	1	37	
6/24	24	2	7.4	2	65	
Daily			55.8	11	44	11.8
6/25	25	1	4.1	2	117	
6/25	26	1	4.3	1	56	
6/25	27	2	6.4	0	0	
6/25	28	2	6.4	4	150	
Daily			21.2	7	81	11.0
6/26	29	1	3.3	5	364	
6/26	30	1	3.3	1	73	
6/26	31	2	6.3	3	114	
6/26	32	2	6.6	0	0	
6/26	33	1	4.3	9	502	
6/26	34	1	4.4	7	382	
6/26	35	2	7.4	7	227	
6/26	36	2	7.4	8	259	
Daily			43.0	40	240	12.0
6/27	37	1	3.3	16	1,164	
6/27	38	1	3.4	10	706	
6/27	39	2	5.4	10	444	
6/27	40	2	6.4	7	263	
6/27	41	1	3.4	33	2,329	
6/27	42	1	2.8	16	1,371	
6/27	43	2	3.5	15	1,029	
6/27	44	2	2.8	19	1,629	
Daily			31.0	126	1,117	13.0

-Continued-

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
6/28	45	1	2.8	12	1,029	
6/28	46	1	2.8	17	1,457	
6/28	47	2	3.4	11	776	
6/28	48	2	3.5	24	1,646	
6/28	49	1	3.4	24	1,694	
6/28	50	1	3.4	22	1,553	
6/28	51	2	3.5	9	617	
6/28	52	2	3.3	13	945	
Daily			26.1	132	1,215	13.8
6/29	53	1	3.3	17	1,236	
6/29	54	1	3.7	14	908	
6/29	55	2	3.3	5	364	
6/29	56	2	4.4	13	709	
6/29	57	1	3.6	23	1,533	
6/29	58	1	3.4	37	2,612	
6/29	59	2	3.8	6	379	
6/29	60	2	4.4	14	764	
Daily			29.9	129	1,063	14.5
6/30	61	1	2.6	13	1,200	
6/30	62	1	3.1	26	2,013	
6/30	63	2	4.4	29	1,582	
6/30	64	2	4.5	10	533	
6/30	65	1	2.5	58	5,568	
6/30	66	1	1.9	60	7,579	
6/30	67	2	2.4	27	2,700	
6/30	68	2	2.5	23	2,208	
Daily			23.9	246	2,923	15.5
7/01	69	1	2.5	23	2,208	
7/01	70	1	2.5	39	3,744	
7/01	71	2	3.4	31	2,188	
7/01	72	2	3.4	24	1,694	
7/01	73	1	2.5	50	4,800	
7/01	74	1	2.6	24	2,215	
7/01	75	2	2.5	18	1,728	
7/01	76	2	2.3	12	1,252	
Daily			21.7	221	2,479	16.5
7/02 [a]	77		2.8	20	1,671	
7/02 [a]	78		3.1	27	2,085	
7/02 [a]	79		3.4	19	1,341	
7/02 [a]	80		3.4	16	1,129	
7/02	81	1	3.1	16	1,239	
7/02	82	1	3.6	14	933	
7/02	83	2	3.4	7	494	
7/02	84	2	3.4	8	565	
Daily			26.2	126	1,182	14.0

-Continued-

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
7/03	85	1	2.3	6	626	
7/03	86	1	2.3	5	522	
7/03	87	2	4.4	15	818	
7/03	88	2	5.4	15	667	
7/03	89	1	4.6	46	2,400	
7/03	90	1	3.4	33	2,329	
7/03	91	2	3.3	16	1,164	
7/03	92	2	4.1	28	1,639	
Daily			29.8	164	1,271	14.0
7/04	93	1	2.4	22	2,200	
7/04	94	1	2.8	16	1,371	
7/04	95	2	3.4	14	988	
7/04	96	2	3.4	22	1,553	
7/04	97	1	2.5	61	5,856	
7/04	98	1	2.4	29	2,900	
7/04	99	2	2.5	30	2,880	
7/04	100	2	2.6	27	2,492	
Daily			22.0	221	2,530	14.0
7/05	101	1	2.5	37	3,552	
7/05	102	1	2.3	14	1,461	
7/05	103	2	2.4	17	1,700	
7/05	104	2	2.4	20	2,000	
7/05	105	1	2.5	36	3,456	
7/05	106	1	2.5	44	4,224	
7/05	107	2	2.5	35	3,360	
7/05 [b]	108		2.5	35	3,360	
Daily			19.6	238	2,889	14.0
7/06 [c]	109		3	26	2,080	
7/06 [c]	110		2.8	14.5	1,243	
7/06 [c]	111		2.85	22	1,853	
7/06 [c]	112		2.9	19.5	1,614	
7/06	113	1	3.5	15	1,029	
7/06	114	1	3.3	15	1,091	
7/06	115	2	3.3	27	1,964	
7/06	116	2	3.4	19	1,341	
Daily			25.1	158	1,527	14.0
7/07	117	1	2.4	19	1,900	
7/07	118	1	2.4	11	1,100	
7/07	119	2	3.5	10	686	
7/07	120	2	3.5	13	891	
7/07	121	1	2.8	16	1,371	
7/07	122	1	2.8	22	1,886	
7/07	123	2	3.5	21	1,440	
7/07	124	2	3.5	15	1,029	
Daily			24.4	127	1,288	14.0

-Continued-

37

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
7/08	125	1	2.4	13	1,300	
7/08	126	1	2.4	7	700	
7/08	127	2	3.9	13	800	
7/08	128	2	3.8	13	821	
7/08	129	1	2.3	11	1,148	
7/08	130	1	2.4	9	900	
7/08	131	2	3.8	9	568	
7/08	132	2	3.9	10	615	
Daily			24.9	85	857	14.8
7/09	133	1	2.8	4	343	
7/09	134	1	3.0	4	320	
7/09	135	2	4.5	9	480	
7/09	136	2	4.4	4	218	
7/09	137	1	2.3	3	313	
7/09	138	1	2.3	9	939	
7/09	139	2	3.5	7	480	
7/09	140	2	3.5	5	343	
Daily			26.3	45	430	15.0
7/10	141	1	2.8	1	86	
7/10	142	1	2.8	5	429	
7/10	143	2	4.4	5	273	
7/10	144	2	4.4	5	273	
Daily			14.4	16	265	15.3
7/11	145	1	2.3	2	209	
7/11	146	1	2.5	2	192	
7/11	147	2	3.4	2	141	
7/11	148	2	3.9	1	62	
7/11	149	1	2.3	5	522	
7/11	150	1	2.8	4	343	
7/11	151	2	3.5	5	343	
7/11	152	2	3.6	2	133	
Daily			24.3	23	243	15.0
7/12	153	1	2.8	1	86	
7/12	154	1	2.8	0	0	
7/12	155	2	3.3	0	0	
7/12	156	2	3.3	1	73	
7/12	157	1	3.6	1	67	
7/12	158	1	3.4	1	71	
7/12	159	2	3.3	0	0	
7/12	160	2	3.4	2	141	
Daily			25.9	6	55	15.0

-Continued-

Date	Set No.	Station	Mean Fishing Time (min)	Sockeye Catch (No. of fish)	Catch per Unit Effort (CPUE)	Mean Water Temp (°C)
7/13	161	1	2.3	0	0	
7/13	162	1	2.3	1	104	
7/13	163	2	3.4	1	71	
7/13	164	2	3.4	0	0	
7/13	165	1	3.3	0	0	
7/13	166	1	3.3	0	0	
7/13	167	2	4.0	2	120	
7/13	168	2	5.3	1	45	
Daily			27.3	5	43	15.5
Max			9.0	61	7,579	16.5
Mean			3.9	13	1,030	13.9
Min			1.9	0	0	11.0

[a] Missed Set No.'s 77 - 80 because of high wind and waves. Interpolated these data by averaging mean fishing time and catch from Set No.'s 69 - 72 and 81 - 84.

[b] Missed Set No. 108 because of a problem with the steering system on the skiff. Interpolated missed drift by repeating index from Set No. 107.

[c] Missed Set No.'s 109 - 112 because of a problem with the steering system on the skiff. Interpolated these data by averaging mean fishing time and catch from Set No.'s 101 - 104 and 113 - 116.

Appendix B.1. Kvichak River sockeye salmon inriver test fishing data summary, 1979 - 2003.

Year	Travel Time (d)	Cumulative Index	Last Date Fished	FPI[a]	Cumulative Tower Count	Date[b]	Data Reference
1979 [c]	2.0	21,901	6/29	243	5,330,532	7/1	Meacham (1980)
1980	2.0	106,315	7/9	174	18,508,524	7/11	Bue & Meacham (1981)
1981	2.0	20,813	7/1	83	1,723,506	7/13	Bue (1982)
1982	2.0	17,718	7/21	63	1,119,996	7/23	Bue (1984)
1983	2.0	13,234	7/12	216	2,853,198	7/14	Yuen (1985)
1984	3.0	45,584	7/12	222	10,111,152	7/15	Yuen et al. (1985)
1985 [d]	5.0	41,649	7/16	171	7,120,506	7/23	Bue et al. (1988)
1986	1.0	25,923	7/15	43	1,102,242	7/16	Yuen et al. (1988)
1987	2.0	55,881	7/14	106	5,945,994	7/16	Fried & Bue (1988a)
1988	1.0	38,743	7/17	104	4,045,500	7/18	Fried & Bue (1988b)
1989	2.0	58,044	7/16	141	8,163,918	7/18	Stratton et al. (1990)
1990	3.0	44,794	7/15	149	6,673,872	7/18	Stratton (1990)
1991	2.0	56,669	7/17	71	4,114,932	7/19	Stratton & Woolington (1992)
1992	4.0	46,755	7/16	100	4,686,828	7/20	Stratton & Crawford (1994)
1993	1.0	47,449	7/20	84	4,007,712	7/21	Stratton & Crawford (1996)
1994	2.0	55,073	7/15	142	7,631,076	7/17	Gray et al. (1999)
1995	2.0	62,556	7/18	154	9,702,972	7/20	Gray et al. (1999)
1996	2.0	18,089	7/17	77	1,396,710	7/19	Gray et al. (1999)
1997	2.0	25,228	7/16	58	1,434,504	7/18	Gray et al. (1999)
1998	2.0	25,041	7/16	91	2,290,584	7/18	Gray et al. (1999)
1999	4.0	73,725	7/16	85	6,266,625	7/20	Gray (2000)
2000	2.0	40,186	7/16	51	1,791,282	7/18	West et al. (2000)
2001	2.0	29,771	7/15	34	1,060,890	7/17	Crawford et al. (2002)
2002	2.0	34,177	7/15	21	703,536	7/17	West (2003a)
2003	2.0	57,220	7/12	29	1,612,560	7/14	Current Report

[a] FPI value from travel time analysis on the final day of test fishing.

[b] Cumulative spawning escapement date is last date fished at test fishing site plus travel time to tower site.

[c] Sites used from 1979 - 1984 were located on west bank above Nakeen (site 1), and on east bank about 2 km above Sea Gull Flat Island.

[d] Data from 1985 to present may not be comparable with those from 1979 - 1984. Test fishing sites were relocated in 1985 about 20 km upriver from old sites, and changes were made in mesh size (from 13.65 cm to 12.7 cm) and in web material (from multifilament nylon to multistrand monofilament).

Appendix B.2. Egegik River sockeye salmon inriver test fishing data summary, 1979 - 2003.

Year	Travel Time (d)	Cumulative Index	Last Date Fished	FPI[a]	Cumulative Tower Count	Date[b]	Data Reference
1979 [c]	1.0	23,980	7/10	38	905,034	7/11	Meacham (1980)
1980	4.0	13,312	7/16	80	1,060,860	7/20	Bue & Meacham (1981)
1981	3.0	18,921	7/13	37	691,764	7/16	Bue (1982)
1982	3.0	30,361	7/12	34	1,029,684	7/15	Bue (1984)
1983	1.0	16,276	7/10	44	718,368	7/11	Yuen (1985)
1984	3.0	26,947	7/12	43	1,151,028	7/15	Yuen et al. (1985)
1985 [d]	4.0	19,974	7/9	53	1,052,250	7/13	Bue et al. (1988)
1986	1.0	16,370	7/14	60	981,841	7/15	Yuen et al. (1988)
1987	2.0	21,810	7/14	53	1,162,464	7/16	Fried & Bue (1988a)
1988	1.0	21,024	7/16	76	1,591,752	7/17	Fried & Bue (1988b)
1989	3.0	30,343	7/12	52	1,590,234	7/15	Stratton et al. (1990)
1990	3.0	17,578	7/16	123	2,155,062	7/19	Stratton (1990)
1991	4.0	31,066	7/12	88	2,722,476	7/16	Stratton & Woolington (1992)
1992	3.0	24,498	7/11	73	1,795,542	7/14	Stratton & Crawford (1994)
1993	1.0	17,189	7/10	78	1,346,160	7/11	Stratton & Crawford (1996)
1994	2.0	12,777	7/12	137	1,708,998	7/14	Gray et al. (1999)
1995	2.0	11,769	7/12	100	1,139,724	7/14	Gray et al. (1999)
1996	2.0	15,043	7/12	72	1,039,428	7/14	Gray et al. (1999)
1997	2.0	20,136	7/12	52	1,051,500	7/14	Gray et al. (1999)
1998	3.0	16,476	7/13	65	1,032,480	7/16	Gray et al. (1999)
1999	5.0	20,568	7/13	82	1,686,576	7/18	Gray (2000)
2000	2.0	13,517	7/13	80	1,024,800	7/15	West et al. (2000)
2001	2.0	16,381	7/12	58	959,598	7/14	Crawford et al. (2002)
2002	2.0	12,611	7/12	79	993,318	7/14	West (2003a)
2003	1.5	19,668	7/11	59	1,147,368	7/13	Current Report

[a] FPI value from travel time analysis on the final day of test fishing.

[b] Cumulative spawning escapement date is last date fished at test fishing site plus travel time to tower site.

[c] Sites used from 1979 - 2000 were located about 3 km upriver from tip of Egg Island on the south (site 1), and on the north bank (site 2).

[d] Data from 1985 to present may not be comparable with those from 1979 - 1984 because changes were made in gillnet mesh size (from 13.65cm to 13.02 cm) and in web material (from multifilament nylon to multistrand monofilament).

Appendix B.3. Ugashik River sockeye salmon inriver test fishing data summary, 1979 - 2003.

Year	Travel Time (d)	Cumulative Index	Last Date Fished	FPI[a]	Cumulative Tower Count	Date[b]	Data Reference
1979 [c]	9.0	42,880	7/13	39	1,662,348	7/22	Meacham (1980)
1980	3.0	85,711	7/17	30	2,550,174	7/20	Bue & Meacham (1981)
1981 [d]	3.0	73,861	7/16	18	1,304,022	7/19	Bue (1982)
1982 [e]	4.0	48,057	7/15	23	1,120,680	7/19	Bue (1984)
1983	1.0	15,485	7/16	54	831,744	7/17	Yuen (1985)
1984	8.0	20,138	7/17	61	1,223,286	7/25	Yuen et al. (1985)
1985 [f]	7.0	30,903	7/16	32	997,026	7/26	Bue et al. (1988)
1986	9.0	36,786	7/15	27	1,001,492	7/24	Yuen et al. (1988)
1987 [g]	6.0	14,393	7/17	41	587,964	7/23	Fried & Bue (1988a)
1988	2.0	16,106	7/24	39	625,752	7/26	Fried & Bue (1988b)
1989	5.0	36,562	7/21	46	1,669,350	7/26	Stratton et al. (1990)
1990	3.0	20,113	7/20	34	692,310	7/23	Stratton (1990)
1991	4.0	27,359	7/15	82	2,255,216	7/19	Stratton & Woolington (1992)
1992	2.0	21,601	7/18	92	1,997,058	7/20	Stratton & Crawford (1994)
1993	2.0	14,793	7/13	87	1,292,046	7/15	Stratton & Crawford (1996)
1994	1.0	8,180	7/17	94	766,638	7/18	Gray et al. (1999)
1995	3.0	9,609	7/17	66	1,136,262	7/20	Gray et al. (1999)
1996	2.0	18,617	7/18	36	610,926	7/20	Gray et al. (1999)
1997	3.0	21,969	7/18	22	481,356	7/21	Gray et al. (1999)
1998	2.0	8,243	7/18	71	589,920	7/20	Gray et al. (1999)
1999	5.0	17,549	7/18	84	1,474,116	7/23	Gray (2000)
2000	2.0	14,901	7/20	42	557,268	7/22	West et al. (2000)
2001	3.0	25,409	7/16	32	816,222	7/19	Crawford et al. (2002)
2002	1.5	18,260	7/15	45	848,754	7/17	West (2003a)
2003	2.0	21,806	7/13	32	716,892	7/15	Current Report

[a] FPI value from travel time analysis on the final day of test fishing.

[b] Cumulative spawning escapement date is last date fished at test fishing site plus travel time to tower site.

[c] Three sites used from 1979-1980 located about 1 km downriver from Ugashik Village on east bank (site 1), and on the west bank about 4 km and 5 km upriver from Ugashik Village (sites 2 & 3, respectively).

[d] Two sites used beginning 1981 located on east bank about 7 km upriver from Ugashik Village (site 1) and on west bank about 8 km upriver from Ugashik Village (site 2).

[e] Site 1 moved to east bank about 5 km upriver from Ugashik Village and Site 2 moved to west bank about 5 km upriver from Ugashik Village.

[f] Data from 1985 to present may not be comparable with those from 1979 - 1984 because changes were made in gillnet mesh size (from 13.65cm to 13.02 cm) and in web material (from multifilament nylon to multistrand monofilament).

[g] Site 1 moved to east bank about 8 km upriver from Ugashik Village and Site 2 moved to west bank about 8 km upriver from Ugashik Village.

Appendix C.1. Drift gillnet catches by day and species at the Kvichak inriver test fish project, 2003.

Date	Fishing Time(min)	Catch							
		Sockeye Salmon	Chinook Salmon	Chum Salmon	Coho Salmon	Pink Salmon	Arctic Char	Rainbow Trout	Starry Flounder
6/20	65.3	0	0	0	0	0	0	0	0
6/21	66.1	1	0	0	0	0	0	0	0
6/22	64.5	51	0	0	0	0	0	0	0
6/23	31.4	1	0	0	0	0	0	0	0
6/24	57.8	10	0	0	0	0	0	0	0
6/25	45.0	43	0	0	0	0	0	0	0
6/26	68.8	38	0	0	0	0	0	0	0
6/27	69.7	88	0	0	0	0	0	0	0
6/28	20.9	396	0	0	0	0	0	0	0
6/29	9.4	209	0	0	0	0	0	0	0
6/30	17.6	203	0	0	0	0	0	0	0
7/01	14.4	145	1	0	0	0	0	0	0
7/02	11.3	265	1	0	0	0	0	0	0
7/03	8.1	199	1	0	0	0	0	0	0
7/04	9.3	155	0	0	0	0	0	0	0
7/05	9.3	149	0	0	0	0	0	0	0
7/06	24.1	302	0	0	0	0	0	0	0
7/07	18.3	170	0	0	0	0	0	0	0
7/08	27.6	159	0	0	0	0	0	0	0
7/09	12.0	120	0	0	0	0	0	0	0
7/10	10.2	176	3	0	0	0	0	0	0
7/11	9.4	97	0	34	0	0	0	0	0
7/12	15.2	29	0	41	0	0	0	0	0
Total		3,006	6	75	0	0	0	0	0

Appendix C.2. Drift gillnet catches by day and species at the Egegik inriver test fish project, 2003.

Date	Fishing Time(min)	Catch							
		Sockeye Salmon	Chinook Salmon	Chum Salmon	Coho Salmon	Pink Salmon	Arctic Char	Rainbow Trout	Starry Flounder
6/15	52.8	22	0	0	0	0	0	0	1
6/16	46.4	55	0	0	0	0	0	0	0
6/17	47.4	67	1	0	0	0	0	0	1
6/18	49.2	72	0	0	0	0	0	0	0
6/19	46.2	106	0	0	0	0	1	0	0
6/20	52.4	98	3	0	0	0	0	0	1
6/21	51.2	57	1	0	0	0	0	0	0
6/22	48.0	19	0	1	0	0	0	0	0
6/23	52.6	152	0	0	0	0	0	0	0
6/24	52.6	152	1	2	0	0	0	0	0
6/25	44.2	390	0	0	0	0	0	0	0
6/26	48.7	210	0	0	0	0	0	0	0
6/27	53.1	341	0	0	0	0	0	0	1
6/28	47.4	245	0	0	0	0	0	0	0
6/29	53.6	49	0	0	0	0	0	0	8
6/30	53.0	131	0	0	0	0	0	0	0
7/01	52.7	317	0	0	0	0	0	0	0
7/02	49.1	416	0	0	0	0	0	0	0
7/03	48.3	371	0	0	0	1	0	0	0
7/04	50.7	166	1	0	0	0	0	0	1
7/05	57.6	135	0	0	0	0	0	0	1
7/06	66.6	76	0	2	0	1	0	0	1
7/07	64.5	144	0	0	0	0	0	0	0
7/08	58.4	71	0	0	0	0	0	0	1
7/09	59.0	58	0	0	0	0	0	0	0
7/10	31.6	77	0	0	0	0	0	0	0
7/11	45.9	23	0	0	0	0	1	0	0
Total		4,020	7	5	0	2	2	0	16

Appendix C.3. Drift gillnet catches by day and species at the Ugashik inriver test fish project, 2003.

Date	Fishing Time(min)	Catch							
		Sockeye Salmon	Chinook Salmon	Chum Salmon	Coho Salmon	Pink Salmon	Arctic Char	Rainbow Trout	Starry Flounder
6/22	57.3	5	4	0	0	0	0	0	13
6/23	50.8	9	0	0	0	0	0	0	0
6/24	55.8	11	3	0	0	0	0	0	0
6/25	21.2	7	3	0	0	0	0	0	0
6/26	43.0	40	1	0	0	0	0	0	0
6/27	31.0	126	1	0	0	0	0	0	0
6/28	26.1	132	2	0	0	0	0	0	0
6/29	29.9	129	1	0	0	0	0	0	0
6/30	23.9	246	0	0	0	0	0	0	0
7/01	21.7	221	3	0	0	0	0	0	0
7/02	26.2	126	0	0	0	0	0	0	0
7/03	29.8	164	0	0	0	0	0	0	0
7/04	22.0	221	0	0	0	0	0	0	0
7/05	19.6	238	2	0	0	0	0	0	0
7/06	25.1	158	0	0	0	0	0	0	0
7/07	24.4	127	0	0	0	0	0	0	0
7/08	24.9	85	1	0	0	0	0	0	0
7/09	26.3	45	0	0	0	0	0	0	0
7/10	14.4	16	0	0	0	0	0	0	0
7/11	24.3	23	0	0	0	0	0	0	0
7/12	25.9	6	1	0	0	0	0	0	0
7/13	27.3	5	0	0	0	0	0	0	0
Total		2,140	22	0	0	0	0	0	13

Appendix D.1. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Kvichak River, 1993.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/22	42.2	23	162	162	111	17,982		6/23	24,366	-26
6/23	32.2	9	73	235	111	26,085		6/24	34,194	-24
6/24	31.3	75	1,562	1,797	111	199,467	160,000	6/25	51,342	289
6/25	21.8	81	2,859	4,656	111	516,816	250,000	6/26	121,254	326
6/26	21.4	59	970	5,626	26	146,276	250,000	6/27	316,566	-54
6/27	16.7	123	2,050	7,676	67	514,292	200,000	6/28	558,960	-8
6/28	31.3	44	487	8,163	120	979,560	150,000	6/29	846,684	16
6/29	13.2	49	1,027	9,190	150	1,378,500	[e]	6/30	931,620	48
6/30	35.2	64	427	9,617	121	1,163,657	150,000	7/1	1,013,760	15
7/1	27.8	89	1,398	11,015	124	1,365,860	375,000	7/2	1,081,356	26
7/2	31.4	143	1,365	12,380	112	1,386,560	325,000	7/3	1,182,366	17
7/3	15.2	127	2,406	14,786	122	1,803,892	500,000	7/4	1,306,998	38
7/4	8.4	162	4,755	19,541	105	2,051,805	750,000	7/5	1,678,014	22
7/5	19.0	158	3,245	22,786	113	2,574,818	900,000	7/6	2,372,136	9
7/6	21.6	144	2,408	25,194	121	3,048,474	700,000	7/7	2,732,874	12
7/7	18.8	131	2,058	27,252	119	3,242,988	550,000	7/8	2,931,708	11
7/8	19.8	148	2,907	30,159	116	3,498,444	500,000	7/9	3,101,490	13
7/9	16.2	158	4,232	34,391	113	3,886,183	400,000	7/10	3,264,420	19
7/10	20.4	132	2,713	37,104	108	4,007,232	300,000	7/11	3,402,450	18
7/11	11.6	150	4,635	41,739	91	3,798,249	300,000	7/12	3,573,750	6
7/12	27.0	64	906	42,645	96	4,093,920	250,000	7/13	3,750,978	9
7/13	16.3	20	386	43,031	87	3,743,697	75,000	7/14	3,818,466	-2
7/14	35.3	59	404	43,435	88	3,822,280	50,000	7/15	3,864,336	-1
7/15	31.8	92	809	44,244	88	3,893,472		7/16	3,893,586	0
7/16	28.0	79	1,263	45,507	88	4,004,616		7/17	3,920,664	2
7/17	18.0	45	847	46,354	86	3,986,444		7/18	3,957,924	1
7/18	21.4	33	471	46,825	85	3,980,125		7/19	3,986,076	0
7/19	29.1	36	423	47,248	85	4,016,080		7/20	3,996,378	0
7/20	28.1	19	202	47,450	84	3,985,800		7/21	4,007,712	-1

| 6/22 - 7/20 | | | | | | Mean Percent Error (MPE) | | | | 27 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 35 |

| 6/26 - 7/20 | | | | | | Mean Percent Error (MPE) | | | | 9 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 14 |

[a] The 1985-92 mean escapement per index point relationship (111 EPI) was used until June 26 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1993. files no longer on file for 1993.

[c] Best travel time estimate at the end of the season was 1 d.

[d] Observation towers not in operation.

[e] Unable to find a Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1993 for this date.

46

Appendix D.2. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Kvichak River, 1994.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
									[d]	
6/22	8.4	0	0	0	108	0		6/24	66	
6/23	70.7	0	0	0	108	0		6/25	144	
6/24	64.9	1	3	3	108	324		6/26	882	-63
6/25	61.3	44	211	214	108	23,112		6/27	7,626	203
6/26	67.7	4	16	230	108	24,840		6/28	23,880	4
6/27	65.8	0	0	230	108	24,840		6/29	24,642	1
6/28	63.0	1	4	234	108	25,272		6/30	24,948	1
6/29	55.8	22	158	392	108	42,336		7/1	25,452	66
6/30	50.0	23	228	620	108	66,960	42,000 [e]	7/2	29,082	130
7/1	35.3	50	792	1,412	109	153,908	130,000 [e]	7/3	253,290	-39
7/2	2.6	116	10,708	12,120	108	1,308,960	800,000	7/4	1,549,182	-16
7/3	4.8	182	9,908	22,028	108	2,379,024	2,000,000 [e]	7/5	2,726,022	-13
7/4	19.0	172	3,438	25,466	129	3,285,114	1,400,000	7/6	3,516,918	-7
7/5	6.4	96	4,843	30,309	116	3,515,844	750,000	7/7	4,271,604	-18
7/6	5.8	122	5,165	35,474	128	4,540,672	1,000,000	7/8	5,130,840	-12
7/7	18.9	45	1,312	36,786	141	5,186,826	950,000	7/9	5,820,486	-11
7/8	5.5	137	6,258	43,044	145	6,241,380	1,100,000	7/10	6,473,112	-4
7/9	5.7	115	5,042	48,086	137	6,587,782	1,200,000	7/11	7,057,722	-7
7/10	20.7	80	2,038	50,124	143	7,167,732	650,000	7/12	7,267,536	-1
7/11	29.1	47	781	50,905	144	7,330,320	260,000	7/13	7,329,930	0
7/12	32.8	75	755	51,660	144	7,439,040	165,000	7/14	7,382,004	1
7/13	25.1	73	973	52,633	143	7,526,519	205,000 [e]	7/15	7,495,488	0
7/14	35.6	46	322	52,955	143	7,572,565	185,000	7/16	7,540,152	0
7/15	12.2	97	2,119	55,074	142	7,820,508	350,000	7/17	7,631,076	2

| 6/24 - 7/15 | | | | | | Mean Percent Error (MPE) | | | | 10 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 27 |

| 7/01 - 7/15 | | | | | | Mean Percent Error (MPE) | | | | -8 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 9 |

[a] The 1985-93 mean escapement per index point relationship (108 EPI) was used until July 1 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] Source: 1994 Bristol Bay Salmon Data, 3-ring binder notebook, Kvichak R Test Fish section.

Appendix D.3. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Kvichak River, 1995.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/21	76.8	0	0	0	111	0		6/23	0	[d]
6/22	38.3	0	0	0	111	0		6/24	0	
6/23	73.2	1	4	4	111	444		6/25	60	640
6/24	68.8	2	7	11	111	1,221		6/26	41,406	-97
6/25	32.0	145	3,236	3,247	111	360,417		6/27	361,350	0
6/26	7.5	157	5,392	8,639	111	958,929		6/28	724,302	32
6/27	25.0	62	970	9,609	111	1,066,599		6/29	941,466	13
6/28	33.6	6	42	9,651	111	1,071,261	345,000 [e]	6/30	1,113,768	-4
6/29	13.6	173	3,826	13,477	111	1,495,947	450,000 [e]	7/1	1,610,586	-7
6/30	5.1	102	5,645	19,122	115	2,199,030	1,100,000 [e]	7/2	2,338,470	-6
7/1	30.4	101	1,260	20,382	119	2,425,458	850,000	7/3	2,797,974	-13
7/2	29.6	95	2,071	22,453	122	2,739,266	400,000	7/4	3,105,426	-12
7/3	27.8	60	1,068	23,521	136	3,198,856	275,000	7/5	3,346,434	-4
7/4	15.8	206	4,292	27,813	138	3,838,194	750,000 [e]	7/6	3,983,466	-4
7/5	11.1	229	8,061	35,874	142	5,094,108	1,750,000	7/7	4,937,724	3
7/6	18.9	232	4,662	40,536	143	5,796,648	1,800,000	7/8	5,930,604	-2
7/7	14.0	200	6,474	47,010	137	6,440,370	1,500,000	7/9	7,020,624	-8
7/8	13.6	132	3,016	50,026	146	7,303,796	1,400,000	7/10	7,683,972	-5
7/9	30.1	94	955	50,981	149	7,596,169	600,000	7/11	8,006,076	-5
7/10	35.1	117	795	51,776	152	7,869,952	275,000 [e]	7/12	8,169,732	-4
7/11	32.6	168	1,282	53,058	158	8,383,164	365,000	7/13	8,430,660	-1
7/12	32.6	183	1,372	54,430	155	8,436,650	300,000	7/14	8,658,360	-3
7/13	24.2	202	3,000	57,430	157	9,016,510	575,000	7/15	8,878,692	2
7/14	29.4	94	806	58,236	155	9,026,580	140,000 [e]	7/16	9,017,946	0
7/15	30.3	66	521	58,757	153	8,989,821	140,000	7/17	9,131,418	-2
7/16	28.8	98	821	59,578	154	9,175,012	140,000 [e]	7/18	9,247,914	-1
7/17	30.8	171	1,342	60,920	154	9,381,680	270,000 [e]	7/19	9,511,962	-1
7/18	25.3	145	1,636	62,556	154	9,633,624	350,000	7/20	9,702,972	-1

| 6/23 - 7/18 | | | | | | Mean Percent Error (MPE) | | | | 20 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 33 |

| 6/30 - 7/18 | | | | | | Mean Percent Error (MPE) | | | | -3 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 4 |

[a] The 1985-94 mean escapement per index point relationship (111 EPI) was used until June 30 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] Source: 1995 Bristol Bay Salmon Data, 3-ring binder notebook, Kvichak R Test Fish section.

Appendix D.4. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Kvichak River, 1996.

			Test Fishing						Observation Tower		
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	Percent Error of Test Fishing Estimate
										[d]
6/21	53.9	0	0	0	93	0		6/23	0	
6/22	71.7	1	3	3	93	279		6/24	42	564
6/23	72.3	2	6	9	93	837		6/25	4,104	-80
6/24	67.0	35	132	141	93	13,113		6/26	25,278	-48
6/25	73.0	6	19	160	93	14,880	11,000	6/27	26,588	-44
6/26	33.3	2	15	175	93	16,275	16,000	6/28	39,954	-59
6/27	64.8	0	0	175	93	16,275	16,000	6/29	40,956	-60
6/28	62.9	0	0	175	228	39,900	[e]	6/30	41,730	-4
6/29	56.9	1	4	179	234	41,886	1,000 [f]	7/1	47,304	-11
6/30	64.9	30	107	286	238	68,068	25,000	7/2	90,198	-25
7/1	47.2	61	430	716	264	189,024	140,000	7/3	224,100	-16
7/2	51.2	218	1,058	1,774	125	221,750	150,000	7/4	317,832	-30
7/3	46.3	119	647	2,421	230	556,830	150,000	7/5	361,242	54
7/4	56.7	34	131	2,552	175	446,600	125,000	7/6	384,966	16
7/5	58.4	26	101	2,653	175	464,275	100,000	7/7	419,982	11
7/6	56.1	48	214	2,867	154	441,518	60,000	7/8	468,372	-6
7/7	34.8	195	1,520	4,387	146	640,502	200,000	7/9	568,224	13
7/8	33.6	135	1,009	5,396	112	604,352	175,000	7/10	668,742	-10
7/9	15.8	112	1,581	6,977	108	753,516	200,000	7/11	769,008	-2
7/10	21.9	139	1,849	8,826	105	926,730	250,000	7/12	859,962	8
7/11	20.3	139	1,859	10,685	93	993,705	175,000	7/13	1,035,414	-4
7/12	29.9	200	1,626	12,311	80	984,880	175,000	7/14	1,159,806	-15
7/13	27.1	115	1,028	13,339	83	1,107,137	125,000	7/15	1,237,662	-11
7/14	22.6	161	2,745	16,084	83	1,334,972	200,000	7/16	1,309,980	2
7/15	20.3	121	1,342	17,426	82	1,428,932	225,000	7/17	1,332,114	7
7/16	32.6	49	366	17,792	80	1,423,360	150,000	7/18	1,352,754	5
7/17	33.3	56	297	18,089	77	1,392,853	100,000	7/19	1,396,710	0

| 6/22 - 7/17 | | | | | | Mean Percent Error (MPE) | | | | 10 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 42 |

| 7/03 - 7/16 | | | | | | Mean Percent Error (MPE) | | | | -1 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 12 |

[a] The 1985-95 mean escapement per index point relationship (93 EPI) was used until June 28 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] No estimated river fish recorded in the test fish file or the daily run summary for this date.

[f] Source: 1996 Bristol Bay Salmon Data, 3-ring binder notebook, Kvichak R Test Fish section.

Appendix D.5. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Kvichak River, 1997.

| | Test Fishing | | | | | | | Observation Tower | | Percent Error of Test Fishing Estimate |
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/21	48.9	0	0	0	84	0		6/23	[d]	
6/22	87.1	4	10	10	84	840		6/24	2,676	-69
6/23	86.4	4	10	20	84	1,680	1,000	6/25	6,300	-73
6/24	86.7	7	19	39	84	3,276	600	6/26	15,108	-78
6/25	88.1	12	32	71	84	5,964	2,000	6/27	41,760	-86
6/26	90.2	9	23	94	84	7,896	2,000	6/28	59,904	-87
6/27	85.6	11	33	127	84	10,668	[e]	6/29	66,636	-84
6/28	77.7	4	15	142	84	11,928	45,000	6/30	72,720	-84
6/29	68.3	7	26	168	84	14,112	25,000	7/1	75,894	-81
6/30	67.2	21	73	241	84	20,244	30,000	· 7/2	82,920	-76
7/1	78.2	35	111	352	84	29,568	45,000	7/3	115,974	-75
7/2	33.8	105	739	1,091	84	91,644	55,000	7/4	157,986	-42
7/3	51.8	195	1,004	2,095	99	207,405	100,000	7/5	206,040	1
7/4	42.3	227	1,304	3,399	109	370,491	200,000	7/6	299,526	24
7/5	28.1	228	1,913	5,312	79	419,648	210,000	7/7	439,404	-4
7/6	21.0	327	4,213	9,525	61	581,025	375,000	7/8	637,146	-9
7/7	33.9	486	3,587	13,112	64	839,168	500,000	7/9	796,824	5
7/8	22.9	221	2,324	15,436	67	1,034,212	400,000	7/10	949,566	9
7/9	30.3	288	2,933	18,369	66	1,212,354	350,000	7/11	1,052,790	15
7/10	33.5	234	1,677	20,046	59	1,182,714	275,000	7/12	1,139,928	4
7/11	36.4	131	903	20,949	57	1,194,093	150,000	7/13	1,200,360	-1
7/12	35.8	156	1,056	22,005	56	1,232,280	100,000	7/14	1,291,050	-5
7/13	36.8	130	869	22,874	57	1,303,818	110,000	7/15	1,348,704	-3
7/14	33.5	83	600	23,474	58	1,361,492	85,000	7/16	1,381,290	-1
7/15	18.0	75	1,024	24,498	58	1,420,884	95,000	7/17	1,410,996	1
7/16	37.9	113	730	25,228	58	1,463,224	100,000	7/18	1,434,504	2

| 6/22 - 7/16 | | | | | | Mean Percent Error (MPE) | | | | -32 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 37 |

| 7/03 - 7/16 | | | | | | Mean Percent Error (MPE) | | | | 3 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 6 |

[a] The 1985-96 mean escapement per index point relationship (84 EPI) was used until July 3 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] No estimate river fish recorded in the test fish files or the daily run summary for this date.

50

Appendix D.6. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Kvichak River, 1998.

			Test Fishing					Observation Tower		
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	Percent Error of Test Fishing Estimate
6/21	75.5	1	4	4	81	324		6/23	[d]	
6/22	51.1	0	0	4	81	324		6/24	60	440
6/23	85.5	0	0	4	81	324		6/25	84	286
6/24	83.2	2	6	10	81	810	1,000	6/26	1,020	-21
6/25	79.9	20	59	69	81	5,589	5,000	6/27	3,048	83
6/26	77.0	48	142	211	81	17,091	15,000	6/28	5,742	198
6/27	79.7	5	14	225	81	18,225	25,000	6/29	16,086	13
6/28	74.6	4	13	238	81	19,278	25,000	6/30	26,130	-26
6/29	79.5	19	53	291	76	22,116	30,000	7/1	31,758	-30
6/30	79.4	16	49	340	68	23,120	30,000	7/2	32,112	-28
7/1	79.5	264	873	1,213	58	70,354	55,000	7/3	84,348	-17
7/2	40.4	325	1,983	3,196	53	169,388	150,000	7/4	232,902	-27
7/3	21.0	131	1,497	4,693	80	375,440	300,000	7/5	417,390	-10
7/4	41.1	432	2,546	7,239	69	499,491	300,000	7/6	597,258	-16
7/5	38.1	272	1,714	8,953	84	752,052	350,000	7/7	752,646	0
7/6	38.6	175	1,076	10,029	84	842,436	275,000	7/8	832,662	1
7/7	42.4	149	853	10,882	81	881,442	150,000	7/9	979,920	-10
7/8	42.2	267	1,518	12,400	80	992,000	200,000	7/10	1,365,540	-27
7/9	26.6	476	4,673	17,073	81	1,382,913	450,000	7/11	1,795,476	-23
7/10	37.6	384	2,410	19,483	85	1,656,055	335,000	7/12	2,070,624	-20
7/11	33.0	208	1,579	21,062	95	2,000,890	250,000	7/13	2,181,300	-8
7/12	29.3	249	2,108	23,170	100	2,317,000	300,000	7/14	2,238,450	4
7/13	35.9	177	1,109	24,279	99	2,403,621	250,000	7/15	2,269,344	6
7/14	35.6	23	138	24,417	95	2,319,615	125,000	7/16	2,279,946	2
7/15	35.4	22	153	24,570	92	2,260,440	25,000	7/17	2,284,782	-1
7/16	19.8	40	471	25,041	91	2,278,731	50,000	7/18	2,290,584	-1

6/22 - 7/16		Mean Percent Error (MPE)	31
		Mean Absolute Percent Error (MAPE)	52

6/29 - 7/16		Mean Percent Error (MPE)	-11
		Mean Absolute Percent Error (MAPE)	13

[a] The 1985-97 mean escapement per index point relationship (81 EPI) was used until June 29 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1998.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

Appendix D.7. Sockeye salmon inriver test fishing data summary and comparison to tower counts,
Kvichak River, 1999.

| | Test Fishing | | | | | | | Observation Tower | | Percent Error of Test Fishing Estimate |
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/21	8.1	0	0	0	106	0		6/25	54	
6/22	39.5	0	0	0	106	0		6/26	90	
6/23	80.9	0	0	0	106	0		6/27	180	
6/24	81.4	14	42	42	106	4,452	4,000	6/28	204	2,082
6/25	78.9	2	6	48	106	5,088	5,000	6/29	438	1,062
6/26	82.3	0	0	48	106	5,088	5,000	6/30	17,400	-71
6/27	68.7	1	4	52	106	5,512	5,000	7/01	104,850	-95
6/28	80.6	0	0	52	106	5,512	5,000	7/02	337,092	-98
6/29	70.7	298	1,322	1,374	106	145,644	150,000	7/03	748,320	-81
6/30	40.2	560	4,944	6,318	106	669,708	700,000	7/04	1,086,408	-38
7/1	18.0	653	11,383	17,701	106	1,876,306	1,800,000	7/05	1,523,532	23
7/2	23.4	378	4,095	21,796	106	2,310,376	2,000,000	7/06	1,827,804	26
7/3	19.7	282	6,631	28,427	106	3,013,262	2,100,000	7/07	2,256,162	34
7/4	14.6	649	11,439	39,866	106	4,225,796	3,000,000	7/08	2,788,716	52
7/5	9.9	251	6,091	45,957	106	4,871,442	3,000,000	7/09	3,192,648	53
7/6	25.9	237	2,348	48,305	80	3,864,400	2,000,000	7/10	3,588,606	8
7/7	32.1	85	648	48,953	79	3,867,287	1,500,000	7/11	3,804,456	2
7/8	15.0	56	945	49,898	69	3,442,962	700,000	7/12	4,032,456	-15
7/9	30.0	53	438	50,336	70	3,523,520	350,000	7/13	4,332,018	-19
7/10	31.1	38	298	50,634	76	3,848,184	300,000	7/14	4,649,838	-17
7/11	27.6	264	2,553	53,187	79	4,201,773	400,000	7/15	4,948,680	-15
7/12	26.3	446	4,751	57,938	80	4,635,040	650,000	7/16	5,111,028	-9
7/13	31.8	278	2,141	60,079	86	5,166,794	850,000	7/17	5,421,666	-5
7/14	30.6	186	1,522	61,601	86	5,297,686	650,000	7/18	5,850,216	-9
7/15	26.4	578	6,034	67,635	85	5,748,975	800,000	7/19	6,039,222	-5
7/16	23.7	475	6,090	73,725	85	6,266,625	1,100,000	7/20	6,109,500	3

6/24 - 7/16   Mean Percent Error (MPE)   125
                                              Mean Absolute Percent Error (MAPE)   166

7/6 - 7/16   Mean Percent Error (MPE)   -7
                                              Mean Absolute Percent Error (MAPE)   10

[a] The 1985-98 mean escapement per index point relationship (106 EPI) was used until July 6 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1999.

[c] Best travel time estimate at the end of the season was 4 d.

Appendix D.8. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Kvichak River, 2000.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/21	73.5	0	0	0	105	0		6/23	108	
6/22	75.7	1	4	4	105	420		6/24	180	133
6/23	75.5	1	3	7	105	735		6/25	210	250
6/24	31.2	2	17	23	105	2,415		6/26	3,570	-32
6/25	73.0	146	668	691	105	72,555	70,000	6/27	21,474	238
6/26	58.8	155	657	1,349	105	141,645	140,000	6/28	41,886	238
6/27	31.1	2	16	1,365	105	143,325	140,000	6/29	66,486	116
6/28	48.0	206	1,196	2,561	105	268,905	250,000	6/30	143,766	87
6/29	18.0	36	284	2,845	105	298,725	400,000 [d]	7/01	214,206	39
6/30	24.5	272	3,390	6,235	105	654,675	500,000	7/02	390,126	68
7/1	25.6	406	4,407	10,641	105	1,117,305	650,000	7/03	606,708	84
7/2	34.4	69	495	11,136	49	545,664	300,000	7/04	701,700	-22
7/3	34.8	18	124	11,260	49	551,740	100,000	7/05	725,208	-24
7/4	59.6	3	12	11,272	54	608,688	10,000	7/06	731,790	-17
7/5	74.7	6	18	11,290	55	620,950	10,000	7/07	734,226	-15
7/6	73.8	0	0	11,290	56	632,240	10,000	7/08	737,634	-14
7/7	28.1	166	1,492	12,782	56	715,792	70,000	7/09	790,482	-9
7/8	29.8	136	1,107	13,889	56	777,784	100,000	7/10	869,382	-11
7/9	54.3	37	184	14,072	54	759,888	70,000	7/11	891,570	-15
7/10	32.4	195	1,561	15,633	55	859,815	100,000	7/12	1,080,930	-20
7/11	26.7	272	2,950	18,583	56	1,040,648	350,000	7/13	1,358,364	-23
7/12 [e]			4,123	22,706	62	1,407,772	350,000	7/14	1,508,904	-7
7/13	17.1	311	5,295	28,001	66	1,848,066	500,000	7/15	1,650,666	12
7/14	24.6	303	3,664	31,665	53	1,678,245	500,000	7/16	1,713,084	-2
7/15	13.2	295	5,488	37,153	56	2,080,568	300,000	7/17	1,759,458	18
7/16	9.1	91	3,033	40,186	51	2,049,486	125,000	7/18	1,791,282	14

6/24 - 7/16		Mean Percent Error (MPE)	31
		Mean Absolute Percent Error (MAPE)	49

7/2 - 7/16		Mean Percent Error (MPE)	-9
		Mean Absolute Percent Error (MAPE)	15

[a] The 1985-99 mean escapement per index point relationship (105 EPI) was used until July 2 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 2000.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Afternoon drifts missed due to motor problems. Estimated River Fish (ERF) was estimated using afternoon drifts from June 28 and morning drifts from June 29.

[e] No test fishing conducted due to motor problems. Daily index was interpolated using data from July 11 and 13.

53

Appendix D.9. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Kvichak River, 2001.

| | Test Fishing | | | | | | Model Estimates | | | | | | | | | | | Observation Tower | | |
| | | | | | | | Historical Mean EPI | | | Travel Time EPI [b] | | | Negotiated EPI [c] | | | Published Inriver Estimate | | | | Percent Error of Test Fishing Estimate |
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt[a]	Forecasted Cumulative Escapement	FPI	Forecast	Estimated River Fish	Lag	FPI	Estimated River Fish	Lag	FPI	Estimated River Fish		Date	Cumulative Escapement	
6/21	40.7	3	18	18	70	1,260	70	1,231	1,189							1,000	6/21	42	2,900
6/22	70.7	1	3	21	70	1,470	70	1,467	1,167							1,000	6/22	300	390
6/23	69.4	35	143	164	70	11,480	70	11,489	10,907							10,000	6/23	582	1,873
6/24	61.9	54	279	443	70	31,010	70	31,008	30,270							30,000	6/24	738	4,102
6/25	53.6	61	523	966	50	48,300	50	48,295	46,177 [d]							46,000	6/25	2,118	2,180
6/26 [e]	49.8	63	986	1,952	50	97,600	50	90,939	85,953							85,000	6/26	4,986	1,857
6/27 [f]	47.4	156	1,929	3,881	50	194,050	50	187,388	173,102	2	15	41,144	3	32	106,581	150,000	6/27	14,286	1,258
6/28	49.3	82	634	4,515	23	103,845				1	11	7,183	2	23	59,856	50,000	6/28	42,460	144
6/29	39.5	187	1,224	5,739	16	91,824				2	16	28,847	2	16	28,847	30,000	6/29	58,188	58
6/30	11.2	65	1,398	7,137	19	135,603				2	19	49,789	2	19	49,789	50,000	6/30	85,716	58
7/01	17.8	107	2,349	9,486	32	303,552				4	40	221,887	3	34	169,174	150,000	7/01	153,642	98
7/02	19.4	81	1,838	11,324	32	362,368				5	66	490,776	2	36	150,112	100,000	7/02	255,924	42
7/03	20.2	89	1,820	13,144	39	512,616				5	69	591,502	3	43	260,450	200,000	7/03	309,486	66
7/04	17.5	172	4,027	17,171	35	600,985				5	69	788,497	2	35	204,400	200,000	7/04	395,844	52
7/05	25.0	116	1,222	18,393	39	717,327				5	65	732,505	2	35	185,509	200,000	7/05	464,472	54
7/06	21.9	66	871	19,264	40	770,560				4	53	416,938	2	35	72,493	140,000 [g]	7/06	594,564	30
7/07	19.2	117	2,514	21,778	42	914,676				4	53	453,419	3	38	127,019	140,000 [g]	7/07	690,210	33
7/08	17.5	124	3,676	25,454	40	1,018,160				3	41	286,910	2	39	240,140	200,000 [g]	7/08	747,390	36
7/09	17.6	77	1,574	27,028	41	1,108,148				3	43	334,190	2	42	219,581	200,000 [g]	7/09	829,242	34
7/10	20.8	79	1,184	28,212	39	1,100,268				3	40	259,384	2	37	103,042	140,000 [g]	7/10	877,932	25
7/11	22.4	41	507	28,719	36	1,033,884				2	35	59,433	3	37	121,822	80,000	7/11	949,530	9
7/12 [h]	22.4	41	507	29,226	35	1,022,910				2	35	35,774	2	35	35,774	35,000	7/12	994,800	3
7/13 [ij]	22.4	41	507	29,733	35	1,040,655				2	35	35,798	1	35	17,588	20,000	7/13	1,013,364	3
7/14	25.6	2	18	29,751	35	1,041,285				2	35	18,372	2	35	18,372	10,000	7/14	1,021,356	2
7/15	12.4	1	20	29,771	35	1,041,985				2	34	1,337	2	34	1,337	1,500	7/15	1,024,464	2

6/21 - 7/15				Mean Percent Error (MPE)	612
				Mean Absolute Percent Error (MAPE)	612
6/29 - 7/15				Mean Percent Error (MPE)	35
				Mean Absolute Percent Error (MAPE)	35

[a] The 1991-2000 mean escapement per index point relationship (70 EPI) was used until June 24; the mean EPI was then downgraded from 70 to 50, based on an analysis of escapement versus EPI and catch rates, and the downgraded value (50 EPI) was used through. June 27. Thereafter, EPI's were based on lag-time relationships.

[b] Based on the best fit as determined by the lowest sums of squares value.

[c] Closest to published value based on input from manager, aerial surveys, and/or passage rates at tower.

[d] Inriver fish estimate based on analysis of escapement vs. EPI and catch rates similar to last year. EPI downgraded from 70 to 50.

[e] One afternoon drift missed on June 26 due to time spent giving away fish to Levelock residents for subsistence use. Estimated River Fish (ERF) was estimated using prior afternoon drift from June 26.

[f] One morning drift missed on June 27. Estimated River Fish (ERF) was estimated using the previous drift from June 27.

[g] Deleted all test fish data collected prior to June 27 for this analysis.

[h] All drifts missed on July 12 due to time spent helping the genetics crew collect Alagnak River samples. Estimated River Fish (ERF) was estimated using drifts from July 11.

[i] All morning drifts were missed on July 13 due to fuel problems. Estimated River Fish (ERF) was estimated using morning drifts from July 11.

[j] All afternoon drifts were missed on July 13 due to the outboard motor overheating and a clogged fuel filter. Estimated River Fish (ERF) was estimated using afternoon drifts from July 11.

54

Appendix D.10. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Kvichak River, 2002.

	Test Fishing				Model Estimates									Published Inriver Estimate	Observation Tower			Daily Percent Error of Test Fishing Estimate
					Historical Mean EPI			Travel Time EPI[b]			Negotiated EPI[c]							
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt[a]	Forecast	Estimated River Fish	Lag	EPI[a]	Estimated River Fish	Lag	EPI[a]	Estimated River Fish		Date	Daily Escapement	Cumulative Escapement	
6/21	35.0	0	0	0	49	0	0								6/21	162	162	
6/22	69.4	0	0	0	49	0	0								6/22	348	510	
6/23	66.6	3	11	11	49	539	0								6/23	570	1,080	
6/24	8.0	4	14	25	49	1,225	0								6/24	270	1,350	
6/25	66.1	1	3	28	49	1,372	22	1	55	186					6/25	54	1,404	
6/26	41.5	12	56	84	49	4,116	2,540	1	55	3,087					6/26	210	1,614	
6/27	54.1	87	428	512	49	25,088	23,344	2	61	29,506					6/27	162	1,776	
6/28 [d]	46.1	176	1,461	1,973				1	11	16,396	1.5	30	53,450	50,000	6/28	3,978	5,754	74
6/29	17.9	102	1,695	3,668				1	12	28,847	1.5	28	79,422	80,000	6/29	11,796	17,550	40
6/30	19.2	105	1,502	5,170				2	31	99,032	2.0	31	99,032	100,000	6/30	37,830	55,380	-7
7/01	14.9	322	6,020	11,190				2	27	202,197	2.0	27	202,197	200,000	7/01	37,494	92,874	-2
7/02 [e]	18.0	234	3,134	14,324				2	31	287,482	2.0	29	253,022	250,000	7/02	69,504	162,378	26
7/03	16.0	201	3,072	17,396				2	27	166,262	2.0	27	166,262	170,000	7/03	137,400	299,778	86
7/04	12.6	126	2,549	19,945				2	25	142,389	2.0	25	142,389	140,000	7/04	63,054	362,832	74
7/05	19.0	218	3,010	22,955				1	20	58,707	1.5	21	93,050	90,000	7/05	26,184	389,016	30
7/06	21.7	229	2,727	25,682				2	22	127,907	1.5	21	94,604	90,000	7/06	55,704	444,720	119
7/07	17.6	145	2,305	27,987				2	21	104,457	1.5	20	83,201	80,000	7/07	31,824	476,544	78
7/08	19.3	139	1,853	29,840				2	19	80,855	1.5	19	52,623	50,000	7/08	22,872	499,416	-14
7/09	19.8	100	1,240	31,080				2	20	60,485	2.0	20	60,485	70,000	7/09	47,868	547,284	57
7/10	21.9	40	477	31,557				2	19	33,047	2.0	19	25,263	25,000	7/10	27,036	574,320	-25
7/11	12.7	7	131	31,688				2	19	11,456	2.0	19	16,363	15,000	7/11	11,394	585,714	-80
7/12 [f]	13.2	7	654	32,342				2	19	15,120	3.0	20	38,832	45,000	7/12	22,290	608,004	-55
7/13	17.6	98	1,372	33,714				2	21	42,604	1.5	21	41,365	35,000	7/13	58,614	666,618	68
7/14	26.4	25	244	33,958				2	21	34,332	1.5	21	25,747	15,000	7/14	20,736	687,354	147
7/15	24.9	22	219	34,177				2	21	9,521	2.0	21	9,521	7,000	7/15	7,626	694,980	11
7/16															7/16	5,616	700,596	
7/17															7/17	2,940	703,536	

6/28- 7/15

Mean Percent Error (MPE) — 35
Mean Absolute Percent Error (MAPE) — 55

[a] A three-year mean EPI of 49, based on a three year hindcasting MAPE analysis, was used through June 27. Thereafter, EPI's were based on lag-time relationships.

[b] Based on the best fit as determined by the lowest sums of squares value.

[c] Closest to published value based on input from manager, aerial surveys, and/or passage rates at tower.

[d] Missed two of four scheduled afternoon drifts. Estimated River Fish (ERF) was estimated using index values from the previous two drifts.

[e] Afternoon drfits missed due to outboard motor overheating. Estimated River Fish (ERF) was estimated using morning drifts from July 2.

[f] Missed evening Drifts on July 12 because crew was picking up aerial survey markers upriver. Crew observed high catch rates in subsistence nets in front of Levelock on the evening of July 12. Estimated River Fish (ERF) was estimated using morning drifts from July 12 and the average index from drifts on the morning of July 13.

Appendix E.1. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 1993.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/15	40.3	49	298	298	72	21,456		6/16	[d]	
6/16	51.4	36	166	464	72	33,408		6/17	[d]	
6/17	38.9	93	763	1,227	72	88,344		6/18	[d]	
6/18	47.3	137	738	1,965	72	141,480		6/19	888	15,832
6/19	41.5	154	948	2,913	72	209,736		6/20	21,342	883
6/20	9.0	41	1,066	3,979	72	286,488		6/21	152,184	88
6/21	45.7	56	416	4,395	72	316,440	125,000	6/22	296,622	7
6/22	26.6	4	36	4,431	72	319,032	[e]	6/23	452,814	-30
6/23	24.6	7	70	4,501	230	1,035,230	?	6/24	551,532	88
6/24	24.2	74	766	5,267	138	726,846	110,000	6/25	620,784	17
6/25	25.3	48	511	5,778	141	814,698	175,000	6/26	731,298	11
6/26	24.7	167	2,083	7,861	165	1,297,065	200,000	6/27	776,544	67
6/27	23.6	30	315	8,176	175	1,430,800	100,000	6/28	796,212	80
6/28	25.8	19	170	8,346	151	1,260,246	50,000	6/29	803,244	57
6/29	29.0	27	226	8,572	98	840,056	[e]	6/30	811,536	4
6/30	13.8	6	97	8,669	97	840,893	30,000	7/1	838,584	0
7/1	31.7	44	284	8,953	97	868,441	40,000	7/2	887,556	-2
7/2	24.1	37	425	9,378	102	956,556	75,000	7/3	907,440	5
7/3	23.8	59	789	10,167	101	1,026,867	125,000	7/4	932,016	10
7/4	24.2	34	336	10,503	99	1,039,797	30,000	7/5	1,002,558	4
7/5	19.3	112	1,782	12,285	106	1,302,210	175,000	7/6	1,105,728	18
7/6	15.1	110	1,769	14,054	108	1,517,832	375,000	7/7	1,167,420	30
7/7	13.8	84	1,543	15,597	111	1,731,267	300,000	7/8	1,215,660	42
7/8	21.7	75	878	16,475	115	1,894,625	200,000	7/9	1,253,484	51
7/9	26.7	48	503	16,978	76	1,290,328	40,000	7/10	1,284,222	0
7/10	15.7	14	211	17,189	75	1,289,175	20,000	7/11	1,346,160	-4

| 6/18 - 7/10 | | | | | | Mean Percent Error (MPE) | | | | 750 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 754 |

| 6/23 - 7/10 | | | | | | Mean Percent Error (MPE) | | | | 27 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 27 |

[a] The 1985-92 mean escapement per index point relationship (72 EPI) was used until June 23 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1993. files no longer on file for 1993.

[c] Best travel time estimate at the end of the season was 1 d.

[d] Observation towers not in operation.

[e] Unable to verify inriver estimate in the daily run summary for these dates.

56

Appendix E.2. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 1994.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/15	54.7	12	47	47	73	3,431		6/17	[d]	
6/16	61.8	6	23	70	73	5,110		6/18	[d]	
6/17	54.7	30	136	206	73	15,038		6/19	[d]	
6/18	48.6	16	79	285	73	20,805		6/20	[d]	
6/19	48.2	15	68	353	73	25,769		6/21	[d]	
6/20	50.6	28	136	489	73	35,697		6/22	816	4,275
6/21	30.6	44	341	830	73	60,590		6/23	1,080	5,510
6/22	62.8	83	326	1,156	73	84,388		6/24	6,018	1,302
6/23	63.2	72	175	1,331	73	97,163		6/25	38,070	155
6/24	53.6	10	45	1,376	73	100,448		6/26	109,248	-8
6/25	56.2	83	634	2,010	73	146,730		6/27	126,612	16
6/26	57.0	10	45	2,055	82	168,510		6/28	137,502	23
6/27	56.3	103	532	2,587	95	245,765		6/29	143,214	72
6/28	50.7	15	71	2,658	68	180,744		6/30	178,302	1
6/29	59.5	39	156	2,814	71	199,794	60,000	7/1	209,712	-5
6/30	45.4	159	891	3,705	68	251,940	85,000	7/2	214,290	18
7/1	60.1	10	39	3,744	81	303,264	95,000 [e]	7/3	243,810	24
7/2	62.3	58	239	3,983	76	302,708	90,000	7/4	465,636	-35
7/3	28.7	118	1,573	5,556	86	477,816	200,000 [e]	7/5	650,400	-27
7/4	27.5	25	200	5,756	116	667,696	22,000	7/6	829,218	-19
7/5	9.2	77	2,048	7,804	112	874,048	175,000	7/7	1,009,356	-13
7/6	20.1	60	881	8,685	106	920,610	75,000	7/8	1,160,532	-21
7/7	20.1	71	974	9,659	119	1,149,421	175,000	7/9	1,337,424	-14
7/8	35.7	18	129	9,788	126	1,233,288	80,000	7/10	1,416,828	-13
7/9	23.8	81	848	10,636	142	1,510,312	125,000	7/11	1,523,220	-1
7/10	21.4	85	1,105	11,741	147	1,725,927	200,000	7/12	1,623,228	6
7/11	27.3	20	179	11,920	138	1,644,960	100,000	7/13	1,665,576	-1
7/12	20.3	62	857	12,777	137	1,750,449	130,000	7/14	1,708,998	2

| 6/24 - 7/15 | | | | | | Mean Percent Error (MPE) | | | | 489 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 503 |

| 7/01 - 7/15 | | | | | | Mean Percent Error (MPE) | | | | 0 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 17 |

[a] The 1985-93 mean escapement per index point relationship (73 EPI) was used until June 26 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1994.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] Source - 1994 Bristol Bay Salmon Data, 3-ring binder notebook, Egegik R Test Fish section.

Appendix E.3. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 1995.

				Test Fishing					Observation Tower		
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]		Date Plus Travel Time[c]	Cumulative Escapement	Percent Error of Test Fishing Estimate
6/16	60.1	9	35	35	79	2,765			6/18	[d]	
6/17	58.6	68	339	374	79	29,546			6/19	456	6,379
6/18	54.4	53	236	610	79	48,190			6/20	5,142	837
6/19	58.5	55	210	820	79	64,780			6/21	20,658	214
6/20	63.5	61	241	1,061	79	83,819			6/22	22,710	269
6/21	56.5	86	428	1,489	79	117,631			6/23	22,788	416
6/22	60.9	40	158	1,647	79	130,113			6/24	26,388	393
6/23	29.3	47	372	2,019	79	159,501			6/25	54,864	191
6/24	66.3	89	282	2,301	79	181,779			6/26	136,548	33
6/25	45.7	100	798	3,099	79	244,821			6/27	224,874	9
6/26	40.4	165	1,087	4,186	36	150,696			6/28	413,640	-64
6/27	23.0	83	1,036	5,222	70	365,540			6/29	529,458	-31
6/28	30.4	194	1,516	6,738	89	599,682	185,000 [e]		6/30	651,534	-8
6/29	34.6	29	193	6,931	101	700,031	170,000 [e]		7/1	731,520	-4
6/30	28.1	107	937	7,868	96	755,328	110,000 [e]		7/2	738,414	2
7/1	29.3	27	199	8,067	105	847,035	120,000		7/3	756,942	12
7/2	26.2	5	54	8,121	93	755,253	25,000		7/4	835,848	-10
7/3	28.6	37	322	8,443	93	785,199	35,000		7/5	891,984	-12
7/4	21.1	82	1,006	9,449	102	963,798	140,000 [e]		7/6	933,210	3
7/5	26.7	6	57	9,506	107	1,017,142	130,000		7/7	936,186	9
7/6	24.3	7	76	9,582	98	939,036	15,000		7/8	1,001,562	-6
7/7	33.8	32	347	9,929	98	973,042	40,000		7/9	1,063,380	-8
7/8	29.2	59	602	10,531	102	1,074,162		?	7/10	1,068,600	1
7/9	25.4	23	215	10,746	102	1,096,092	70,000		7/11	1,092,234	0
7/10	10.0	2	49	10,795	101	1,090,295	25,000 [e]		7/12	1,113,714	-2
7/11	27.0	43	562	11,357	101	1,147,057	60,000		7/13	1,128,558	2
7/12	24.8	32	412	11,769	100	1,176,900	100,000		7/14	1,139,724	3

| 6/17 - 7/12 | | | | | | Mean Percent Error (MPE) | | | | | 332 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | | 343 |

| 6/26 - 7/12 | | | | | | Mean Percent Error (MPE) | | | | | -7 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | | 10 |

[a] The 1985-94 mean escapement per index point relationship (79 EPI) was used until June 26 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1995.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] Source - 1995 Bristol Bay Salmon Data, 3-ring binder notebook, Egegik R Test Fish section.

Appendix E.4. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 1996.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/15	66.9	83	326	326	80	26,080		6/17	[d]	
6/16	44.2	72	390	716	80	57,280		6/18	[d]	
6/17	59.7	95	464	1,180	80	94,400		6/19	11,220	741
6/18	58.9	29	144	1,324	80	105,920		6/20	21,870	384
6/19	27.6	4	32	1,356	80	108,480	100,000	6/21	21,960	394
6/20	55.3	11	66	1,422	80	113,760	90,000	6/22	23,220	390
6/21	59.6	4	19	1,441	80	115,280	90,000	6/23	44,394	160
6/22	56.4	45	202	1,643	80	131,440	100,000	6/24	71,772	83
6/23	24.8	164	1,962	3,605	80	288,400	75,000 [e]	6/25	96,240	200
6/24	56.1	33	153	3,758	45	169,110	100,000 [e]	6/26	98,538	72
6/25	54.7	99	647	4,405	50	220,250	140,000	6/27	99,426	122
6/26	61.6	18	70	4,475	44	196,900	110,000	6/28	136,602	44
6/27	49.3	20	95	4,570	30	137,100	40,000	6/29	172,470	-21
6/28	46.4	156	1,091	5,661	30	169,830	36,000	6/30	206,904	-18
6/29	20.5	74	1,004	6,665	41	273,265	55,000 [e]	7/1	243,126	12
6/30	47.3	86	567	7,232	40	289,280	90,000	7/2	289,164	0
7/1	39.9	94	647	7,879	39	307,281	70,000	7/3	349,878	-12
7/2	49.0	117	819	8,698	42	365,316	80,000	7/4	380,994	-4
7/3	48.2	58	366	9,064	44	398,816	80,000	7/5	398,196	0
7/4	56.3	58	243	9,307	46	428,122	80,000	7/6	406,800	5
7/5	53.0	27	157	9,464	48	454,272	60,000	7/7	441,486	3
7/6	61.6	59	236	9,700	46	446,200	50,000	7/8	492,828	-9
7/7	50.8	140	726	10,426	48	500,448	70,000	7/9	555,078	-10
7/8	50.5	152	1,011	11,437	50	571,850	100,000	7/10	789,726	-28
7/9	51.5	148	853	12,290	53	651,370	100,000	7/11	1,015,800	-36
7/10	26.6	162	1,918	14,208	64	909,312	125,000	7/12	1,036,488	-12
7/11	40.8	87	714	14,922	71	1,059,462	50,000	7/13	1,038,858	2
7/12	39.5	20	121	15,043	72	1,083,096	50,000	7/14	1,042,128	4

| 6/17 - 7/12 | | | | | | Mean Percent Error (MPE) | | | | 95 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 106 |

| 6/24 - 7/12 | | | | | | Mean Percent Error (MPE) | | | | 6 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 21 |

[a] The 1985-95 mean escapement per index point relationship (80 EPI) was used until June 24 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1996.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] Source - 1996 Bristol Bay Salmon Data, 3-ring binder notebook, Egegik R Test Fish section.

Appendix E.5. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 1997.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/15	14.6	18	279	279	80	22,320		6/17	[d]	
6/16	34.9	78	498	777	80	62,160		6/18	[d]	
6/17	47.0	116	640	1,417	80	113,360		6/19	14,634	675
6/18	25.1	66	742	2,159	80	172,720		6/20	40,734	324
6/19	50.9	124	634	2,793	80	223,440		6/21	54,300	311
6/20	49.3	72	350	3,143	80	251,440		6/22	89,130	182
6/21	49.3	135	652	3,795	80	303,600		6/23	99,702	205
6/22	52.9	71	363	4,158	80	332,640	100,000	6/24	105,960	214
6/23	47.1	52	260	4,418	31	136,958	40,000	6/25	112,284	22
6/24	48.3	32	183	4,601	27	124,227	23,000	6/26	119,694	4
6/25	44.7	30	165	4,766	26	123,916	16,000	6/27	144,858	-14
6/26	52.0	36	171	4,937	27	133,299	15,000	6/28	187,494	-29
6/27	42.6	74	452	5,389	31	167,059	25,000	6/29	231,528	-28
6/28	48.9	79	422	5,811	40	232,440	50,000	6/30	266,094	-13
6/29	45.3	94	649	6,460	42	271,320	46,000	7/1	282,390	-4
6/30	47.0	89	514	6,974	42	292,908	50,000	7/2	289,008	1
7/1	53.9	23	103	7,077	45	318,465	40,000	7/3	302,622	5
7/2	23.4	66	775	7,852	43	337,636	50,000	7/4	310,578	9
7/3	55.1	89	454	8,306	42	348,852	50,000	7/5	319,830	9
7/4	51.9	74	378	8,684	40	347,360	50,000	7/6	338,082	3
7/5	50.2	107	875	9,559	38	363,242	50,000	7/7	508,746	-29
7/6	36.8	131	1,351	10,910	38	414,580	85,000	7/8	636,552	-35
7/7	33.2	380	3,853	14,763	49	723,387	230,000	7/9	675,780	7
7/8	44.6	163	968	15,731	49	770,819	150,000	7/10	688,032	12
7/9	52.8	178	921	16,652	43	716,036	60,000	7/11	864,228	-17
7/10	45.0	174	1,299	17,951	43	771,893	100,000	7/12	945,528	-18
7/11	47.0	223	1,486	19,437	50	971,850	125,000	7/13	1,013,658	-4
7/12	45.7	111	699	20,136	52	1,047,072	75,000	7/14	1,051,500	0

| 6/17 - 7/12 | | | | | Mean Percent Error (MPE) | | | | | 69 |
| | | | | | Mean Absolute Percent Error (MAPE) | | | | | 84 |

| 6/23 - 7/12 | | | | | Mean Percent Error (MPE) | | | | | -6 |
| | | | | | Mean Absolute Percent Error (MAPE) | | | | | 13 |

[a] The 1985-96 mean escapement per index point relationship (80 EPI) was used until June 23 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1997.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

Appendix E.6. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 1998.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/14	28.9	17	127	127	72	9,144		6/17	[d]	
6/15	51.4	66	327	454	72	32,688		6/18	24	136,100
6/16	56.0	45	227	681	72	49,032	45,000	6/19	216	22,600
6/17	56.7	18	82	763	72	54,936	50,000	6/20	2,232	2,361
6/18	54.5	20	89	852	72	61,344	50,000	6/21	3,780	1,523
6/19	59.5	24	94	946	72	68,112	58,000	6/22	4,914	1,286
6/20	59.3	27	108	1,054	72	75,888	50,000	6/23	19,980	280
6/21	59.8	64	266	1,320	72	95,040	[e]	6/24	41,178	131
6/22	25.6	108	1,044	2,364	72	170,208	80,000	6/25	68,652	148
6/23	66.9	83	290	2,654	72	191,088	80,000	6/26	90,600	111
6/24	55.6	152	773	3,427	46	157,642	100,000	6/27	122,994	28
6/25	73.6	257	870	4,297	46	197,662	90,000	6/28	148,452	33
6/26	52.0	82	392	4,689	41	192,249	100,000	6/29	198,480	-3
6/27	58.5	154	835	5,524	41	226,484	100,000	6/30	244,722	-7
6/28	57.4	46	187	5,711	41	234,151	75,000	7/1	340,398	-31
6/29	50.6	192	1,184	6,895	43	296,485	100,000	7/2	425,676	-30
6/30	38.1	298	2,173	9,068	45	408,060	160,000	7/3	439,296	-7
7/1	65.7	62	238	9,306	55	511,830	170,000	7/4	489,732	5
7/2	64.5	34	122	9,428	55	518,540	90,000	7/5	504,582	3
7/3	51.6	110	721	10,149	43	436,407	90,000	7/6	575,598	-24
7/4	63.3	94	392	10,541	55	579,755	90,000	7/7	677,466	-14
7/5	47.0	231	1,332	11,873	54	641,142	130,000	7/8	713,742	-10
7/6	26.3	107	1,862	13,735	57	782,895	200,000	7/9	731,004	7
7/7	56.7	80	347	14,082	62	873,084	200,000	7/10	776,106	12
7/8	56.0	48	203	14,285	60	857,100	150,000	7/11	835,200	3
7/9	62.6	31	120	14,405	58	835,490	100,000	7/12	859,476	-3
7/10	62.4	79	318	14,723	63	927,549	70,000	7/13	889,242	4
7/11	58.9	151	682	15,405	61	939,705	60,000	7/14	953,022	-1
7/12	73.2	29	99	15,504	61	945,744	50,000	7/15	1,018,110	-7
7/13	60.4	208	972	16,476	65	1,070,940	150,000	7/16	1,032,480	4

6/15 - 7/13		Mean Percent Error (MPE)	5,672
		Mean Absolute Percent Error (MAPE)	5,682

6/24 - 7/13		Mean Percent Error (MPE)	-2
		Mean Absolute Percent Error (MAPE)	12

[a] The 1985-97 mean escapement per index point relationship (72 EPI) was used until June 24 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1998.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] No in-river fish estimate published on this date.

Appendix E.7. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 1999.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/14	28.6	5	41	41	62	2,542		6/19	0	
6/15	59.9	10	42	83	62	5,146		6/20	0	
6/16	63.1	9	31	114	62	7,068		6/21	24	29,350
6/17	59.5	51	199	313	62	19,406		6/22	48	40,329
6/18	62.7	151	574	887	62	54,994		6/23	114	48,140
6/19	62.1	77	285	1,172	62	72,664	72,000	6/24	144	50,361
6/20	62.3	115	512	1,684	62	104,408	100,000	6/25	162	64,349
6/21	63.9	92	339	2,023	62	125,426	120,000	6/26	240	52,161
6/22	61.9	37	146	2,169	62	134,478	135,000	6/27	690	19,390
6/23	37.1	80	486	2,655	62	164,610	165,000	6/28	750	21,848
6/24	49.5	134	652	3,307	62	205,034	200,000	6/29	3,720	5,412
6/25	56.5	75	312	3,619	62	224,378	200,000	6/30	9,318	2,308
6/26	61.1	9	29	3,648	62	226,176	200,000	7/1	65,718	244
6/27	54.3	160	802	4,450	62	275,900	150,000	7/2	126,720	118
6/28	32.8	212	1,636	6,086	62	377,332	250,000	7/3	338,682	11
6/29	55.3	264	1,167	7,253	62	449,686	350,000	7/4	437,118	3
6/30	53.1	352	1,627	8,880	62	550,560	450,000	7/5	536,760	3
7/1	39.4	377	2,624	11,504	62	713,248	575,000	7/6	710,244	0
7/2	50.2	313	1,790	13,294	62	824,228	650,000	7/7	973,116	-15
7/3	27.2	270	2,891	16,185	62	1,003,470	700,000	7/8	1,136,394	-12
7/4	24.1	209	2,230	18,415	62	1,141,730	750,000	7/9	1,330,404	-14
7/5	34.7	72	480	18,895	62	1,171,490	650,000	7/10	1,472,382	-20
7/6	25.6	99	916	19,811	62	1,228,282	500,000	7/11	1,562,754	-21
7/7	64.5	30	97	19,908	75	1,493,100	500,000	7/12	1,648,578	-9
7/8	76.8	11	33	19,941	75	1,495,575	350,000	7/13	1,671,756	-11
7/9	52.0	9	38	19,979	75	1,498,425	150,000	7/14	1,688,616	-11
7/10							50,000 [d]	7/15	1,708,188	
7/11	17.6	8	109	20,088	82	1,647,216	100,000	7/16	1,716,000	-4
7/12	41.4	37	214	20,302	82	1,664,764	50,000	7/17	1,727,772	-4
7/13	31.8	39	266	20,568	82	1,686,576	35,000	7/18	1,727,772	-2

6/16 - 7/13		Mean Percent Error (MPE)	12,367
		Mean Absolute Percent Error (MAPE)	12,376

7/7 - 7/13		Mean Percent Error (MPE)	-7
		Mean Absolute Percent Error (MAPE)	7

[a] The 1986-98 mean escapement per index point relationship (62 EPI) was used until July 7 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1999.

[c] Best travel time estimate at the end of the season was 5 d.

[d] Source - 1999 Bristol Bay Salmon Data, 3-ring binder notebook, Egegik R Test Fish section.

Appendix E.8. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 2000.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/14	37.4	2	13	13	77	1,001		6/16	[d]	
6/15	71.0	10	33	46	77	3,542		6/17	[d]	
6/16	78.5	12	37	83	77	6,391		6/18	[d]	
6/17	67.0	40	151	234	77	18,018		6/19	6,234	189
6/18	67.6	94	335	569	77	43,813	40,000	6/20	12,330	255
6/19	66.5	187	683	1,252	77	96,404	96,000	6/21	21,348	352
6/20	53.3	88	406	1,658	77	127,666	113,000	6/22	28,776	344
6/21	72.2	51	177	1,835	77	141,295	120,000	6/23	42,750	231
6/22	68.4	15	52	1,887	77	145,299	100,000	6/24	91,734	58
6/23	64.3	20	86	1,973	77	151,921	100,000	6/25	185,790	-18
6/24	31.0	340	3,294	5,267	77	405,559	300,000	6/26	345,258	17
6/25	54.3	231	1,391	6,658	77	512,666	300,000	6/27	547,164	-6
6/26	74.0	39	123	6,781	77	522,137	200,000	6/28	592,398	-12
6/27	35.5	19	128	6,909	77	531,993	20,000	6/29	610,608	-13
6/28	70.5	28	95	7,004	77	539,308	40,000	6/30	618,366	-13
6/29	71.7	73	231	7,235	90	651,150	40,000	7/1	641,946	1
6/30	71.1	66	220	7,455	89	663,495	40,000	7/2	651,606	2
7/1	69.6	17	57	7,512	91	683,592	40,000	7/3	675,546	1
7/2	67.6	60	218	7,730	87	672,510	30,000	7/4	697,440	-4
7/3	72.9	4	14	7,744	90	696,960	25,000	7/5	763,170	-9
7/4	53.0	300	1,912	9,656	90	869,040	185,000	7/6	779,808	11
7/5	66.4	86	302	9,958	98	975,884	150,000	7/7	786,168	24
7/6	66.1	15	55	10,013	80	801,040	30,000	7/8	792,000	1
7/7	61.4	9	34	10,047	78	783,666	7,000	7/9	795,906	-2
7/8	73.0	15	47	10,094	79	797,426	7,000	7/10	805,986	-1
7/9	68.1	39	136	10,230	79	808,170	10,000	7/11	855,006	-5
7/10	72.1	293	1,000	11,230	79	887,170	10,000	7/12	917,130	-3
7/11	83.1	238	744	11,974	83	993,842	100,000	7/13	962,082	3
7/12	33.3	132	947	12,921	81	1,046,601	125,000	7/14	1,011,306	3
7/13	79.5	200	593	13,514	80	1,081,120	125,000	7/15	1,024,800	5

| 6/17 - 7/13 | | | | | | Mean Percent Error (MPE) | | | | 52 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 59 |

| 6/29 - 7/13 | | | | | | Mean Percent Error (MPE) | | | | 2 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 5 |

[a] The 1985-99 mean escapement per index point relationship (77 EPI) was used until June 29 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 2000.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

Appendix E.9. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 2001.

| | Test Fishing | | | | | | Model Estimates | | | | | | | | | | Published Inriver Estimate | Observation Tower | | Percent Error of Test Fishing Estimate |
| | | | | | | | Historical Mean EPI | | | Travel Time EPI[b] | | | Negotiated EPI[c] | | | | | | |
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt[a]	Forecasted Cumulative Escapement	FPI	Forecast	Estimated River Fish	Lag	FPI	Estimated River Fish	Lag	FPI	Estimated River Fish		Date	Cumulative Escapement	
6/14	55.6	26	118	118	76	8,968	76	8,962	8,962								6/14	d	
6/15	57.7	13	46	164	76	12,464	76	12,478	12,478								6/15	d	
6/16	64.9	52	177	341	76	25,916	76	25,930	25,930								6/16	d	
6/17	38.9	62	380	721	76	54,796	76	54,812	54,812								6/17	d	
6/18	64.5	99	339	1,060	76	80,560	76	80,541	63,753							80,000	6/18	16,788	380
6/19	62.0	157	591	1,651	76	125,476	76	125,434	98,602	1	25	14,956	3	79	102967	100,000	6/19	26,832	368
6/20	67.4	155	510	2,161	64	138,304	64	138,274	100,780[e]	1	23	11,587	3	52	74827	100,000	6/20	37,494	269
6/21	71.8	188	563	2,724	64	174,336	64	174,325	125,503	1	23	12,729	3	46	76,662	75,000	6/21	48,822	257
6/22	63.8	159	527	3,251	64	208,064	64	208,047	82,863	5	174	439,067	2	58	63,168	80,000	6/22	125,184	66
6/23	69.5	89	273	3,524	64	225,536	64	225,499	48,511	5	167	411,454	2	65	51,956	48,000	6/23	176,988	27
6/24	67.3	146	522	4,046	64	258,944	64	258,915	45,765	4	99	185,970	2	66	52,116	45,000	6/24	213,150	21
6/25	53.2	306	1,401	5,447	64	348,608	64	348,554	116,498	4	85	231,928	2	66	126,663	110,000	6/25	232,056	50
6/26	51.1	250	1,295	6,742	64	431,488	64	431,418	156,396	4	85	295,280	2	68	183,235	125,000	6/26	275,022	57
6/27	63.6	24	97	6,839	59	403,501	64	437,600	116,702	5	99	354,069	2	59	81,981	90,000	6/27	320,898	26
6/28	67.9	120	403	7,242	62	449,004				2	62	30,711	2	62	30,711	30,000	6/28	414,636	8
6/29	58.8	131	612	7,854	69	541,926				2	69	76,691	2	69	76,691	75,000	6/29	465,288	16
6/30	67.7	119	389	8,243	69	568,767				2	69	69,397	2	69	69,397	60,000[f]	6/30	501,978	13
7/01	38.4	103	581	8,824	67	591,208				3	72	113,434	2	66	64,150	70,000	7/01	519,126	14
7/02	67.3	110	358	9,182	64	587,648				2	65	60,721	2	65	60,721	50,000	7/02	532,944	10
7/03	45.0	212	1,145	10,327	61	629,947				2	62	92,701	2	62	92,701	80,000	7/03	544,278	16
7/04	59.8	228	932	11,259	59	664,281				2	60	125,233	2	60	125,233	100,000	7/04	553,698	20
7/05	54.5	368	1,820	13,079	60	784,740				3	68	263,360	2	60	165,354	160,000	7/05	620,544	26
7/06	49.1	263	1,319	14,398	61	878,278				2	64	199,903	2	64	199,903	175,000	7/06	717,006	22
7/07	51.1	171	797	15,195	62	942,090				2	63	134,123	2	63	134,123	120,000	7/07	828,834	14
7/08	50.8	167	775	15,970	62	990,140				2	62	97,513	2	62	97,513	100,000	7/08	892,524	11
7/09	64.4	60	165	16,135	61	984,235				2	61	59,169	2	61	59,169	60,000	7/09	932,322	6
7/10	70.4	40	137	16,272	60	976,320				2	59	17,833	2	59	17,833	30,000	7/10	942,774	4
7/11	64.8	9	34	16,308	59	962,054				1	58	1,956	2	59	9,996	15,000	7/11	946,224	2
7/12	61.7	20	75	16,381	58	950,098				1	58	4,339	2	58	6,306	5,000	7/12	946,878	0

| 6/18 - 7/12 | | Mean Percent Error (MPE) | 68 |
| | | Mean Absolute Percent Error (MAPE) | 68 |

| 6/28 - 7/12 | | Mean Percent Error (MPE) | 12 |
| | | Mean Absolute Percent Error (MAPE) | 12 |

[a] The 1991-2000 mean escapement per index point relationship (76 EPI) was used until June 19; the mean EPI was then downgraded from 76 to 64, based on an analysis of escapement versus EPI and catch rates, and the downgraded value (64 EPI) was used through June 28 when lag-time relationships became more accurate.

[b] Based on the best fit as determined by the lowest sums of squares value.

[c] Closest to published value based on input from manager, aerial surveys, and/or passage rates at tower.

[d] Observation towers not in operation.

[e] Historical mean EPI downgraded from 76 to 64 based on analysis of escapement vs EPI (Lowell Fair).

[f] Inriver fish estimate based on 8:00 am 7/01 aerial survey and 2-day lag time estimate.

Appendix E.10. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Egegik River, 2002.

	Test Fishing				Model Estimates									Published Inriver Estimate	Observation Tower			Daily Percent Error of Test Fishing Estimate
					Historical Mean EPI			Travel Time EPI[b]			Negotiated EPI[c]							
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt[a]	Forecast	Estimated River Fish	Lag	EPI[a]	Estimated River Fish	Lag	EPI[a]	Estimated River Fish		Date	Daily Escapement	Cumulative Escapement	
6/14	61.8	3	12	12	67	783	783								6/14	d	d	
6/15	63.1	55	205	217	67	14,510	14,510								6/15	d	d	
6/16	64.5	54	199	416	67	27,829	27,829								6/16	d	d	
6/17	57.1	118	420	836	67	55,994	55,994							55,000	6/17	d	d	
6/18	66.0	65	224	1,060	67	71,005	62,053	3.0	41	34,854				65,000	6/18	8,952	8,952	
6/19	60.2	11	40	1,100	67	73,853	60,237	3.0	32	22,091				60,000	6/19	4,464	13,416	
6/20	60.5	11	44	1,144	67	76,605	40,113	3.0	44	13,432	3.5	58	29802	30,000	6/20	23,076	36,492	-47
6/21	33.0	6	44	1,188	67	79,524	20,568	3.0	56	7,074	3.0	64	17,012	17,000	6/21	22,464	58,956	-82
6/22	61.5	25	97	1,285	67	85,994	11,840	4.0	70	15,654	3.0	68	13,090	13,000	6/22	15,198	74,154	-90
6/23	67.4	151	487	1,772	67	118,652	39,464	4.0	72	48,380	2.5	68	41,240	45,000	6/23	5,034	79,188	-78
6/24 [a]	48.7	252	1,809	3,581				4.0	93	225,721	1.5	75	162,546	165,000	6/24	26,742	105,930	-1
6/25	45.4	342	1,881	5,462				1.0	57	107,034	1.5	83	249,521	250,000	6/25	97,776	203,706	34
6/26	63.2	49	181	5,643				1.0	62	295,280	1.5	83	130,403	130,000	6/26	134,112	337,818	7
6/27	67.4	199	637	6,280				2.0	81	66,229	2.0	80	60,135	60,000	6/27	104,328	442,146	-11
6/28	73.6	110	313	6,593				2.0	85	60,478	1.5	82	62,652	60,000	6/28	35,664	477,810	23
6/29	69.7	234	825	7,418				2.0	81	92,429	1.5	79	75,780	75,000	6/29	32,274	510,084	64
6/30	72.5	100	308	7,726				2.0	83	94,175	2.0	83	94,175	90,000	6/30	37,704	547,788	48
7/01	77.4	316	941	8,667				2.0	76	95,207	2.0	77	102,018	100,000	7/01	17,142	564,930	-22
7/02	72.2	267	838	9,503				2.0	79	140,773	2.0	78	129,225	130,000	7/02	46,686	611,616	-14
7/03	63.0	119	426	9,929				2.0	80	101,280	2.0	80	101,280	100,000	7/03	83,286	694,902	32
7/04	64.9	66	236	10,165				2.0	80	53,026	2.0	80	53,026	50,000	7/04	66,132	761,034	42
7/05	71.9	156	476	10,641				2.0	78	55,301	2.0	78	55,301	50,000	7/05	10,422	771,456	2
7/06	34.6	6	42	10,683				2.0	79	40,713	2.0	79	40,713	40,000	7/06	26,892	798,348	-43
7/07	70.4	204	624	11,307				2.0	78	51,704	2.0	78	51,704	50,000	7/07	27,528	825,876	-44
7/08	67.8	123	370	11,677				2.0	81	80,992	2.0	81	75,992	75,000	7/08	44,352	870,228	-7
7/09	68.4	50	169	11,846				2.0	81	59,169	2.0	82	52,988	50,000	7/09	48,060	918,288	-2
7/10	76.0	210	593	12,439				2.0	82	62,131	2.0	82	62,131	60,000	7/10	33,642	951,930	148
7/11	61.9	35	130	12,569				2.0	82	59,354	1.5	80	33,036	40,000	7/11	20,460	972,390	356
7/12	61.5	11	42	12,611				2.0	79	13,541	2.0	79	19,262	20,000	7/12	4,548	976,938	18
7/13															7/13	5,388	982,326	
7/14															7/14	10,992	993,318	

6/24 - 7/12

Mean Percent Error (MPE)   14
Mean Absolute Percent Error (MAPE)   53

[a] The starting EPI value of 67 was based on a mean EPI univariate time series model with a moving average parameter of two. This value was used through June 19. Thereafter, EPIs were based on lag-time relationships.
[b] Based on the best fit as determined by the lowest sums of squares value.
[c] Closest to published value based on input from manager, aerial surveys, and/or passage rates at tower.
[d] Observation towers not in operation.
[a] Only completed two of four scheduled afternoon drifts because of the extremely high catch rates from the first two drifts. Estimated River Fish (ERF) was estimated using the average index value from the first two drifts.

Appendix F.1. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 1993.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/24	61.6	1	4	4	49	196		6/26	[d]	
6/25	117.2	5	9	13	49	637		6/27	[d]	
6/26	110.9	2	4	17	49	833	1,000	6/28	12	6,842
6/27	108.2	3	7	24	49	1,176	1,000	6/29	264	345
6/28	110.6	4	9	33	49	1,617	1,500	6/30	372	335
6/29	111.0	9	20	53	49	2,597	[e]	7/1	402	546
6/30	53.5	7	31	84	49	4,116	2,500	7/2	762	440
7/1	102.1	10	22	106	49	5,194	3,000	7/3	1,338	288
7/2	115.1	14	26	132	9	1,188	5,000	7/4	2,328	-49
7/3	110.7	31	68	200	15	3,000	8,000	7/5	3,564	-16
7/4	111.4	18	39	239	11	2,629	7,500	7/6	5,340	-51
7/5	116.6	47	96	335	17	5,695	10,000	7/7	11,178	-49
7/6	48.4	162	1,561	1,896	15	28,440	[e]	7/8	148,932	-81
7/7	9.8	212	5,877	7,773	5	38,865	400,000	7/9	555,084	-93
7/8	24.8	209	4,376	12,149	19	230,831	[e]	7/10	966,150	-76
7/9	21.2	100	1,937	14,086	71	1,000,106	500,000	7/11	1,201,350	-17
7/10	45.9	61	407	14,493	79	1,144,947	175,000	7/12	1,268,322	-10
7/11	56.1	41	177	14,670	85	1,246,950	50,000	7/13	1,279,320	-3
7/12	53.1	11	50	14,720	87	1,280,640	25,000	7/14	1,287,270	-1
7/13	51.7	16	73	14,793	87	1,286,991	10,000	7/15	1,292,046	0

| 6/26 - 7/13 | | | | | | Mean Percent Error (MPE) | | | | 464 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 513 |

| 7/2 - 7/13 | | | | | | Mean Percent Error (MPE) | | | | -37 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 37 |

[a] The 1985-92 mean escapement per index point relationship (49 EPI) was used until July 2 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1993. files no longer on file for 1993.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] Unable to verify inriver estimate in the daily run summary or the test fish notebook for these dates.

66

Appendix F.2. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 1994.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/25	121.3	8	15	15	53	795		6/26	[d]	
6/26	109.1	10	22	37	53	1,961		6/27	[d]	
6/27	79.3	5	14	51	53	2,703		6/28	[d]	
6/28	117.1	9	20	71	53	3,763		6/29	[d]	
6/29	110.9	3	6	77	53	4,081	4,000	6/30	[d]	
6/30	100.7	6	14	91	53	4,823	5,000	7/1	[d]	
7/1	104.6	6	14	105	53	5,565	5,000 [e]	7/2	[d]	
7/2	101.0	9	21	126	53	6,678	7,000	7/3	228	2,829
7/3	106.0	5	13	139	53	7,367	7,000 [e]	7/4	708	941
7/4	48.1	0	0	139	53	7,367	7,000	7/5	960	667
7/5	101.6	3	8	147	53	7,791	7,000	7/6	1,440	441
7/6	48.9	1	5	152	53	8,056	6,500	7/7	1,698	374
7/7	101.1	24	71	223	53	11,819	10,000	7/8	1,818	550
7/8	83.2	57	165	388	53	20,564	18,000	7/9	6,648	209
7/9	40.0	196	1,322	1,710	53	90,630	85,000	7/10	108,618	-17
7/10	21.6	139	1,545	3,255	90	292,950	140,000	7/11	313,296	-6
7/11	24.5	120	1,229	4,484	90	403,560	110,000	7/12	520,500	-22
7/12	29.9	82	656	5,140	137	704,180	185,000	7/13	570,576	23
7/13	29.0	97	830	5,970	119	710,430	140,000 [e]	7/14	594,738	19
7/14	34.4	54	376	6,346	99	628,254	37,000	7/15	626,022	0
7/15	22.5	65	1,020	7,366	98	721,868	100,000	7/16	689,166	5
7/16	26.0	39	357	7,723	93	718,239	33,000	7/17	727,656	-1
7/17	20.0	36	457	8,180	94	768,920	40,000 [e]	7/18	766,638	0

| 7/2 - 7/17 | | | | | Mean Percent Error (MPE) | | | | | 376 |
| | | | | | Mean Absolute Percent Error (MAPE) | | | | | 382 |

| 7/10 - 7/17 | | | | | Mean Percent Error (MPE) | | | | | 2 |
| | | | | | Mean Absolute Percent Error (MAPE) | | | | | 10 |

[a] The 1985-93 mean escapement per index point relationship (53 EPI) was used until July 10 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1994.

[c] Best travel time estimate at the end of the season was 1 d.

[d] Observation towers not in operation.

[e] Source - 1994 Bristol Bay Salmon Data, 3-ring binder notebook, Ugashik R Test Fish section.

Appendix F.3. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 1995.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/24	58.7	2	8	8	80	640		6/27	[d]	
6/25	123.0	2	4	12	80	960		6/28	[d]	
6/26	121.3	2	4	16	80	1,280		6/29	[d]	
6/27	108.7	1	2	18	80	1,440		6/30	[d]	
6/28	92.5	2	5	23	80	1,840	1,800 [a]	7/1	[d]	
6/29	101.8	12	28	51	80	4,080	4,000 [a]	7/2	[d]	
6/30	117.4	30	62	113	80	9,040	9,000 [a]	7/3	3,078	194
7/1	101.9	78	185	298	80	23,840	24,000	7/4	7,722	209
7/2	107.4	101	227	525	80	42,000	40,000	7/5	11,532	264
7/3	115.0	87	182	707	80	56,560	50,000	7/6	33,570	68
7/4	121.0	134	284	991	80	79,280	70,000 [a]	7/7	89,376	-11
7/5	81.4	138	568	1,559	80	124,720	115,000	7/8	131,052	-5
7/6	76.8	147	471	2,030	80	162,400	130,000	7/9	143,340	13
7/7	86.9	65	197	2,227	74	164,798	100,000	7/10	155,004	6
7/8	104.6	51	126	2,353	84	197,652	65,000	7/11	166,362	19
7/9	47.0	41	208	2,561	81	207,441	60,000	7/12	184,350	13
7/10	50.7	139	722	3,283	74	242,942	90,000 [a]	7/13	194,118	25
7/11	56.9	87	371	3,654	70	255,780	90,000	7/14	201,930	27
7/12	79.0	63	197	3,851	70	269,570	90,000	7/15	207,780	30
7/13	82.4	49	144	3,995	68	271,660	75,000	7/16	231,720	17
7/14	79.1	63	195	4,190	58	243,020	40,000 [a]	7/17	277,626	-12
7/15	49.7	93	633	4,823	53	255,619	50,000	7/18	556,164	-54
7/16	14.1	125	2,343	7,166	58	415,628	180,000 [a]	7/19	914,160	-55
7/17	13.5	137	2,443	9,609	66	634,194	360,000 [a]	7/20	1,136,262	-44
7/18	16.4	218	4,169	13,778	77	1,060,906	500,000	7/21	1,227,120	-14
7/19	13.6	112	2,055	15,833	81	1,282,473		7/22	1,249,398	3

6/30 - 7/17		Mean Percent Error (MPE)	35
		Mean Absolute Percent Error (MAPE)	54

7/7 - 7/17		Mean Percent Error (MPE)	-3
		Mean Absolute Percent Error (MAPE)	24

[a] The 1985-94 mean escapement per index point relationship (80 EPI) was used until July 7 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1995.

[c] Best travel time estimate at the end of the season was 3 d.

[d] Observation towers not in operation.

[e] Source - 1995 Bristol Bay Salmon Data, 3-ring binder notebook, Ugashik R Test Fish section.

Appendix F.4. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 1996.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/23	56.5	7	29	29	95	2,755		6/25	[d]	
6/24	102.9	8	20	49	95	4,655		6/26	[d]	
6/25	110.9	8	17	66	95	6,270	6,000	6/27	[d]	
6/26	63.3	6	23	89	95	8,455	6,000	6/28	[d]	
6/27	122.3	11	21	110	95	10,450	10,000	6/29	[d]	
6/28	109.5	4	9	119	95	11,305	10,000	6/30	[d]	
6/29	102.3	10	23	142	95	13,490	13,000	7/1	[d]	
6/30	100.0	22	54	196	95	18,620	18,000	7/2	[d]	
7/1	90.3	87	243	439	95	41,705	40,000 [e]	7/3	5,604	644
7/2	34.5	171	1,167	1,606	95	152,570	100,000 [e]	7/4	34,470	343
7/3	17.6	181	2,584	4,190	95	398,050	250,000	7/5	97,626	308
7/4	17.2	163	2,406	6,596	95	626,620	350,000	7/6	194,946	221
7/5	22.5	135	1,669	8,265	41	338,865	350,000	7/7	245,946	38
7/6	88.3	129	386	8,651	40	346,040	350,000	7/8	282,606	22
7/7	76.6	163	562	9,213	40	368,520	100,000 [e]	7/9	296,118	24
7/8	59.3	94	458	9,671	40	386,840	125,000	7/10	302,952	28
7/9	89.4	44	125	9,796	39	382,044	100,000	7/11	311,322	23
7/10	98.3	67	165	9,961	35	348,635	50,000	7/12	317,994	10
7/11	37.9	46	290	10,251	34	348,534	50,000	7/13	323,286	8
7/12	83.6	57	188	10,439	33	344,487	30,000	7/14	328,962	5
7/13	97.3	41	108	10,547	32	337,504	25,000	7/15	338,568	0
7/14	99.9	55	136	10,683	33	352,539	20,000	7/16	396,222	-11
7/15	29.8	159	1,992	12,675	33	418,275	100,000	7/17	484,836	-14
7/16	9.2	130	3,393	16,068	37	594,516	200,000	7/18	551,766	8
7/17	12.9	88	1,814	17,882	38	679,516	200,000	7/19	585,210	16
7/18	18.8	59	735	18,617	36	670,212	130,000	7/20	610,926	10

| 7/1 - 7/18 | | | | | | Mean Percent Error (MPE) | | | | 93 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 96 |

| 7/5 - 7/18 | | | | | | Mean Percent Error (MPE) | | | | 12 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 15 |

[a] The 1985-95 mean escapement per index point relationship (95 EPI) was used until July 5 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1996.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] Source - 1996 Bristol Bay Salmon Data, 3-ring binder notebook, Ugashik R Test Fish section.

69

Appendix F.5. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 1997.

	Test Fishing							Observation Tower		
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	Percent Error of Test Fishing Estimate
6/24	113.4	16	34	34	30	1,020		6/27	[d]	
6/25	112.3	12	27	61	30	1,830		6/28	[d]	
6/26	117.4	16	31	92	30	2,760	3,000	6/29	[d]	
6/27	112.9	22	51	143	30	4,290	4,000	6/30	[d]	
6/28	90.6	32	96	239	30	7,170	14,000	7/1	[d]	
6/29	90.5	19	51	290	30	8,700	8,000	7/2	210	4,043
6/30	84.7	47	135	425	30	12,750	12,000	7/3	1,500	750
7/1	41.4	15	89	514	30	15,420	15,000	7/4	2,976	418
7/2	84.3	25	72	586	30	17,580	17,500	7/5	4,680	276
7/3	94.0	20	51	637	30	19,110	18,000	7/6	7,050	171
7/4	95.3	28	71	708	30	21,240	20,000	7/7	16,338	30
7/5	81.9	38	112	820	30	24,600	25,000	7/8	29,838	-18
7/6	66.1	63	229	1,049	30	31,470	45,000	7/9	61,218	-49
7/7	27.7	121	1,358	2,407	44	105,908	85,000	7/10	95,448	11
7/8	20.7	127	1,686	4,093	36	147,348	120,000	7/11	143,538	3
7/9	21.2	157	1,794	5,887	33	194,271	160,000	7/12	192,594	1
7/10	21.7	131	1,480	7,367	31	228,377	140,000	7/13	229,674	-1
7/11	20.7	243	3,013	10,380	30	311,400	175,000	7/14	273,246	14
7/12	19.7	125	1,620	12,000	32	384,000	200,000	7/15	334,122	15
7/13	18.8	164	2,181	14,181	33	467,973	240,000	7/16	355,146	32
7/14	18.6	195	2,662	16,843	24	404,232	140,000	7/17	391,242	3
7/15	19.2	153	2,094	18,937	25	473,425	150,000	7/18	416,160	14
7/16	20.2	49	638	19,575	23	450,225	100,000	7/19	429,414	5
7/17	37.1	112	797	20,372	22	448,184	80,000	7/20	453,222	-1
7/18	12.9	75	1,597	21,969	22	483,318	80,000	7/21	481,356	0

6/29 - 7/18		Mean Percent Error (MPE)	286
		Mean Absolute Percent Error (MAPE)	293

7/7 - 7/18		Mean Percent Error (MPE)	8
		Mean Absolute Percent Error (MAPE)	8

[a] The 1985-96 mean escapement per index point relationship (30 EPI) was used until July 7 when lag-time relationships began to prove more accurate.
[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1997.
[c] Best travel time estimate at the end of the season was 3 d.
[d] Observation towers not in operation.

70

Appendix F.6. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 1998.

	Test Fishing							Observation Tower		
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	Percent Error of Test Fishing Estimate
6/26	111.6	24	53	53	54	2,862		6/28	[d]	
6/27	116.4	14	29	82	54	4,428	2,000	6/29	[d]	
6/28	120.1	17	34	116	54	6,264	3,000	6/30	[d]	
6/29	121.1	13	25	141	54	7,614	3,500	7/1	[d]	
6/30	119.1	8	16	157	54	8,478	4,000	7/2	72	11,675
7/1	119.6	13	26	183	54	9,882	5,000	7/3	1,698	482
7/2	120.1	4	8	191	54	10,314	5,000	7/4	2,466	318
7/3	116.9	13	27	218	54	11,772	5,000	7/5	3,600	227
7/4	116.9	3	6	224	54	12,096	5,000	7/6	5,136	136
7/5	58.3	4	16	240	54	12,960	5,000	7/7	11,976	8
7/6	118.5	30	61	301	54	16,254	5,000	7/8	22,146	-27
7/7	89.7	76	220	521	43	22,403	10,000	7/9	37,260	-40
7/8	65.0	84	348	869	53	46,057	25,000	7/10	52,482	-12
7/9	71.3	68	279	1,148	53	60,844	25,000	7/11	86,538	-30
7/10	76.6	172	540	1,688	53	89,464	40,000	7/12	141,216	-37
7/11	19.6	121	1,427	3,115	53	165,095	150,000	7/13	239,064	-31
7/12	38.1	294	1,911	5,026	64	321,664	225,000	7/14	402,414	-20
7/13	40.0	217	1,304	6,330	76	481,080	250,000	7/15	494,700	-3
7/14	39.6	112	677	7,007	76	532,532	125,000	7/16	522,144	2
7/15	35.8	76	528	7,535	78	587,730	90,000	7/17	538,890	9
7/16	38.4	42	262	7,797	73	569,181	50,000	7/18	557,562	2
7/17	39.6	26	156	7,953	71	564,663	30,000	7/19	575,118	-2
7/18	40.2	49	290	8,243	71	585,253	30,000	7/20	589,920	-1

| 6/30 - 7/18 | | | | | Mean Percent Error (MPE) | | | | | 666 |
| | | | | | Mean Absolute Percent Error (MAPE) | | | | | 687 |

| 7/7 - 7/18 | | | | | Mean Percent Error (MPE) | | | | | -13 |
| | | | | | Mean Absolute Percent Error (MAPE) | | | | | 16 |

[a] The 1985-97 mean escapement per index point relationship (54 EPI) was used until July 7 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1998.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

Appendix F.7. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 1999.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/24	19.4	0	0	0	54	0		6/29	[d]	
6/25	82.4	5	15	15	54	810	800	6/30	[d]	
6/26	63.0	7	27	42	54	2,268	2,000	7/1	[d]	
6/27	59.2	13	53	95	54	5,130	5,000	7/2	0	
6/28	61.9	13	50	145	54	7,830	7,000	7/3	0	
6/29	62.4	28	108	253	54	13,662	10,000	7/4	0	
6/30	56.0	82	360	613	54	33,102	30,000	7/5	0	
7/1	55.6	101	459	1,072	54	57,888	50,000	7/6	0	
7/2	44.3	161	1,148	2,220	54	119,880	80,000	7/7	6	
7/3	11.4	27	573	2,793	54	150,822	100,000	7/8	33,186	354
7/4	12.8	81	1,792	4,585	54	247,590	200,000	7/9	237,126	4
7/5	13.8	164	2,779	7,364	54	397,656	350,000	7/10	426,780	-7
7/6	11.2	220	4,732	12,096	54	653,184	500,000	7/11	610,188	7
7/7	6.0	69	2,727	14,823	54	800,442	500,000	7/12	938,928	-15
7/8	25.2	101	1,437	16,260	54	878,040	600,000	7/13	1,293,270	-32
7/9	43.3	48	263	16,523	54	892,242	450,000	7/14	1,371,798	-35
7/10							[e]	7/15	1,460,058	
7/11	25.1	37	353	16,876	54	911,304	150,000	7/16	1,505,904	-39
7/12	23.6	24	239	17,115	54	924,210	150,000	7/17	1,527,366	-39
7/13	5.5	1	44	17,159	54	926,586	[f]	7/18	1,537,914	-40
7/14	26.3	9	82	17,241	54	931,014	[f]	7/19	1,540,962	-40
7/15	28.1	10	86	17,327	54	935,658	[f]	7/20	1,547,310	-40
7/16	29.1	8	66	17,393	54	939,222	[f]	7/21	1,555,998	-40
7/17	13.7	5	87	17,480	83	1,450,840	20,000	7/22	1,580,808	-8
7/18	53.5	15	69	17,549	84	1,474,116	20,000	7/23	1,606,242	-8

| 7/3 - 7/18 | | | | | | Mean Percent Error (MPE) | | | | 2 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 44 |

| 7/17 - 7/18 | | | | | | Mean Percent Error (MPE) | | | | -8 |
| | | | | | | Mean Absolute Percent Error (MAPE) | | | | 8 |

[a] The 1986-98 mean escapement per index point relationship (54 EPI) was used until July 17 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 1999.

[c] Best travel time estimate at the end of the season was 5 d.

[d] Observation towers not in operation.

[e] No inriver fish estimate calculated for 7/10. One mid-day high tide on this date; entire drift session missed due to high winds.

[f] No inriver fish estimates published for these dates according to 1999 Bristol Bay Salmon Data, 3-ring binder notebook, Ugashik R Test Fish section.

Appendix F.8. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 2000.

	Test Fishing							Observation Tower		Percent Error of Test Fishing Estimate
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt.[a]	Forecasted Cumulative Escapement	Estimated River Fish[b]	Date Plus Travel Time[c]	Cumulative Escapement	
6/24	26.1	6	54	54	58	3,132		6/26	[d]	
6/25	71.6	10	32	86	58	4,988	5,000	6/27	[d]	
6/26	97.7	7	17	103	58	5,974	6,000	6/28	[d]	
6/27	94.7	4	10	113	58	6,554	7,000	6/29	[d]	
6/28	44.8	5	27	140	58	8,120	8,000	6/30	[d]	
6/29	78.3	53	174	314	58	18,212	18,000	7/1	[d]	
6/30	36.5	111	676	990	58	57,420	60,000	7/2	[d]	
7/1	14.9	89	1,271	2,261	58	131,138	135,000	7/3	58,800	123
7/2	11.9	87	1,785	4,046	58	234,668	220,000	7/4	126,780	85
7/3	23.0	134	1,380	5,426	58	314,708	260,000	7/5	166,986	88
7/4	50.6	32	176	5,602	58	324,916	200,000	7/6	178,044	82
7/5	67.2	17	67	5,669	58	328,802	50,000	7/7	181,680	81
7/6	94.6	12	30	5,699	58	330,542	10,000	7/8	183,822	80
7/7	92.6	8	21	5,720	31	177,320	2,000	7/9	186,210	-5
7/8	94.6	37	95	5,815	31	180,265	4,000	7/10	187,956	-4
7/9	93.3	41	105	5,920	32	189,440	8,000	7/11	194,394	-3
7/10	98.5	66	161	6,081	32	194,592	15,000	7/12	207,936	-6
7/11	82.9	74	228	6,309	32	201,888	15,000	7/13	230,886	-13
7/12	42.9	39	221	6,530	34	222,020	20,000	7/14	238,134	-7
7/13	66.8	95	340	6,870	36	247,320	30,000	7/15	249,948	-1
7/14	71.0	100	356	7,226	36	260,136	30,000	7/16	267,522	-3
7/15	49.5	92	439	7,665	36	275,940	30,000	7/17	338,490	-18
7/16	20.8	200	2,347	10,012	36	360,432	100,000	7/18	422,568	-15
7/17	18.8	123	1,602	11,614	33	383,262	75,000	7/19	481,506	-20
7/18	21.2	81	1,071	12,685	35	443,975	70,000	7/20	514,998	-14
7/19	23.7	102	1,182	13,867	40	554,680	90,000	7/21	537,996	3
7/20	11.1	52	1,034	14,901	42	625,842	[e]	7/22	557,268	12

| 7/1 - 7/20 | | | | | Mean Percent Error (MPE) | | | | | 22 |
| | | | | | Mean Absolute Percent Error (MAPE) | | | | | 33 |

| 7/7 - 7/20 | | | | | Mean Percent Error (MPE) | | | | | -7 |
| | | | | | Mean Absolute Percent Error (MAPE) | | | | | 9 |

[a] The 1985-99 mean escapement per index point relationship (58 EPI) was used until July 7 when lag-time relationships began to prove more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information. Source: Bristol Bay Salmon Fishery, preliminary sockeye salmon daily run summary, 2000.

[c] Best travel time estimate at the end of the season was 2 d.

[d] Observation towers not in operation.

[e] No inriver estimate published for this date.

Appendix F.9. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 2001.

| | Test Fishing | | | | | | Model Estimates | | | | | | | | | | Observation Tower | | |
| | | | | | | | Historical Mean EPI | | | Travel Time EPI[b] | | | Negotiated EPI[c] | | | Published | | | Percent Error |
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt[a]	Forecasted Cumulative Escapement	FPI	Forecast	Estimated River Fish	Lag	FPI	Estimated River Fish	Lag	FPI	Estimated River Fish	Inriver Estimate	Date	Cumulative Escapement	of Test Fishing Estimate
6/24	61.8	21	81	81	40	3,240	40	3,230	3,230							15,000		e	
6/25	64.6	14	52	133	40	5,320	40	5,323	5,323							15,000		e	
6/26	63.1	16	60	193	40	7,720	40	7,705	7,705							12,000		e	
6/27	69.0	16	57	250	40	10,000	40	9,997	9,997							12,000		e	
6/28	64.0	39	147	397	40	15,880	40	15,880	15,880							15,000		e	
6/29	65.7	42	154	551	40	22,040	40	22,023	19,089	3	23	9,204	4	36	17,070	19,000	6/29	2,934	651
6/30	67.2	61	218	769	40	30,760	40	30,758	20,720	5	75	47,983	3	40	20,847	20,000	6/30	10,038	206
7/1	33.9	30	214	983	40	39,320	40	39,325	23,425	5	119	101,562	2	40	23,474	20,000	7/1	15,900	147
7/2	66.8	47	169	1,152	40	46,080	40	46,079	26,303	5	79	71,380	3	36	21,602	25,000	7/2	19,776	133
7/3	66.9	36	129	1,281	40	51,240	40	51,244	26,110	5	63	55,971	4	46	33,350	25,000	7/3	25,134	104
7/4	66.9	66	236	1,517	29	43,993	40	60,695	32,495	3	24	8,945	3	29	15,325	15,000	7/4	28,200	56
7/5	53.2	89	459	1,976	25	49,400				2	23	16,055	3	28	21,171	20,000	7/5	29,586	67
7/6	13.7	197	3,378	5,354	30	160,620				2	23	86,906	4	30	125,375	130,000	7/6	34,368	367
7/7	11.8	235	4,651	10,005	32	320,160				2	28	226,190	3	37	311,435	260,000	7/7	55,674	475
7/8	14.8	219	3,861	13,866	26	360,516				2	24	208,212	2	24	208,212	230,000	7/8	130,974	175
7/9	16.1	208	3,207	17,073	26	443,898				2	24	168,822	2	24	168,822	190,000	7/9	238,992	86
7/10	14.6	185	3,037	20,110	30	603,300				2	28	172,761	2	28	172,761	200,000	7/10	383,634	57
7/11	16.6	150	2,349	22,459	35	786,065				3	39	337,423	2	32	171,771	200,000	7/11	544,470	44
7/12	17.4	136	1,874	24,333	36	875,988				3	40	290,165	2	34	143,282	200,000	7/12	682,350	28
7/13	26.6	85	821	25,154	34	855,236				3	37	186,275	2	33	89,114	100,000	7/13	742,740	15
7/14	51.8	30	140	25,294	33	834,702				2	32	30,425	3	34	97,241	40,000	7/14	770,364	8
7/15	48.3	16	77	25,371	32	811,872				2	31	6,793	3	32	33,549	20,000	7/15	786,486	3
7/16	50.9	8	38	25,409	32	813,088				2	31	3,597	3	32	8,046	6,000	7/16	794,334	2

6/29 - 7/16   Mean Percent Error (MPE)   146
           Mean Absolute Percent Error (MAPE)   146

7/7 - 7/16   Mean Percent Error (MPE)   90
           Mean Absolute Percent Error (MAPE)   90

[a] The 1991-2000 trimmed mean escapement per index point relationship (40 EPI) was used until July 4 when lag-time relationships became more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information.

[c] Observation towers not in operation.

Appendix F.10. Sockeye salmon inriver test fishing data summary and comparison to tower counts, Ugashik River, 2002.

	Test Fishing				Model Estimates									Published Inriver Estimate	Observation Tower			Daily Percent Error of Test Fishing Estimate
					Historical Mean EPI			Travel Time EPI [b]			Negotiated EPI [c]							
Date	Fishing Time(min)	Catch (no)	Daily Index	Cumulative Index	Escapement per Index Pt [a]	Forecast	Estimated River Fish	Lag	EPI [a]	Estimated River Fish	Lag	EPI [a]	Estimated River Fish		Date	Daily Escapement	Cumulative Escapement	
6/24	24.0	2	18	18	57	1,026	1,026									[d]	[d]	
6/25	31.7	6	24	42	57	2,394	2,394									[d]	[d]	
6/26	65.8	9	35	77	57	4,389	4,389									[d]	[d]	
6/27	60.8	7	28	105	57	5,985	5,985									[d]	[d]	
6/28	29.3	5	40	145	57	8,260	8,260							8,000		[d]	[d]	
6/29	62.2	3	12	157	57	8,923	8,095	4.0	20	2,254				8,000	6/29	828	828	
6/30 [e]	31.6	9	70	227	57	12,884	12,002	3.0	8	1,016				10,000	6/30	54	882	
7/1	54.7	32	142	369	40	14,728	13,415 [f]	3.0	9	2,025				13,000	7/1	432	1,314	
7/2	47.6	49	253	622	40	24,833	22,991	5.0	18	71,380				23,000	7/2	528	1,842	
7/3	51.6	41	202	824				1.0	15	3,080	3.5	50	31,684	32,000	7/3	7,620	9,462	-17
7/4	43.4	42	240	1,064				2.0	29	12,970	2.5	40	24,286	24,000	7/4	8,760	18,222	-17
7/5	37.0	67	484	1,548				2.0	28	16,055	3.0	40	38,929	40,000	7/5	4,722	22,944	-25
7/6	18.5	47	626	2,174				2.0	29	31,805	2.5	32	39,103	40,000	7/6	7,494	30,438	-16
7/7	42.3	53	305	2,479				2.0	42	39,007	2.0	42	39,007	40,000	7/7	34,380	64,818	162
7/8	45.0	34	183	2,662				1.0	30	5,512	2.0	34	15,894	15,000	7/8	9,756	74,574	2
7/9	48.3	24	120	2,782				1.0	30	3,590	3.0	40	31,548	30,000	7/9	5,106	79,680	-93
7/10	25.0	212	2,661	5,443				1.0	32	86,289	4.0	46	160,169	160,000	7/10	10,482	90,162	-76
7/11	10.1	288	6,948	12,391				1.0	39	273,895	1.0	45	343,028	350,000	7/11	124,362	214,524	15
7/12	15.7	189	3,584	15,975				1.0	41	148,015	1.0	43	175,208	175,000	7/12	297,156	511,680	-15
7/13	22.2	120	1,373	17,348				1.0	45	61,763	1.0	46	79,443	80,000	7/13	206,850	718,530	51
7/14	27.6	68	594	17,942				1.0	44	26,394	1.5	46	55,080	50,000	7/14	52,458	770,988	45
7/15	39.3	52	318	18,260				1.0	44	14,138	1.5	45	24,370	20,000	7/15	27,084	798,072	-33
7/16															7/16	21,552	819,624	
7/17															7/17	29,130	848,754	

7/3 - 7/15		Mean Percent Error (MPE)	-1
		Mean Absolute Percent Error (MAPE)	44

[a] A linear regression analysis of percent 2-ocean through "lock in"(the point at which the travel time commences each year) date versus historical EPI at "lock in" was used to estimate the starting EPI. The resulting EPI of 57 was used through June 30. The mean EPI was then downgraded from 57 to 40, based on catch rates similar to last year. This value was used through July 2 when lag time relationships became more accurate.

[b] Estimated river fish is a subjective estimate of fish that have entered the river but have not passed the counting tower based on all available information.

[c] Closest to published value based on input from manager, aerial surveys, and/or passage rates at tower.

[d] Observation towers not in operation.

[e] Missed morning sets on June 30 due to 30-40 mph southwest winds. Estimated River Fish (ERF) was estimated using index values from afternoon drifts.

[f] EPI downgraded from 57 to 40 based on catch rates similar to last year.

75